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THE AMERICAN JOURNAL

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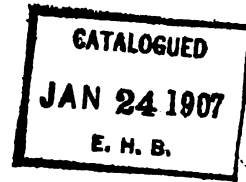
OPHTHALMOLOGY,

VOLUME XIV. -- 1897.

ADOLF ALT, M.D.,

1897.

ST. LOUIS, MO.



INDEX TO VOLUME XIV.

ORIGINAL ARTICLES.

	PAGE.
A Sase of Quinine Amaurosis; Observations Extending Over Ten Years. By HENRY DICKSON BRUNS, -	1
A Case of Endothelioma of the Dura Mater and Brain. By ADOLF ALT, - - - - -	4
Quinine Amblyopia. By S. C. AYRES, - - - - -	13
Illumination of the Javal Astigmometer. By L. R. CULBERTSON, - - - - -	14
Is There Extra-Crystalline Accommodation? By CH. A. BEARD, - - - - -	33
Is There a Layer of Pigment Epithelium Cells Between the Choroid and Retina? By ADOLF ALT, -	39
A New Ophthalmic Record Book. By L. R. CULBERTSON, - - - - -	45
A Case of Paralysis of the Superior Oblique in Nephritis. By HOWARD F. HANSELL, - - - - -	65
Report of Two Cases of Scopolamine Poisoning. By L. R. CULBERTSON, - - - - -	67
Detachment of the Choroid and Retina by Concussion. By S. D. RISLEY, - - - - -	68
Another Case of Tumor of the Palpebral (Accessory) Lachrymal Gland, Including Some Remarks on Tumors of the Orbital Lachrymal Gland. By ADOLF ALT, - - - - -	70
A Case of Chloroma. By S. C. AYRES and ADOLF ALT, - - - - -	78
Papilloid Growth on the Bulbar Conjunctiva. By S. M. BURNETT, - - - - -	97
Ethmoidal Disease. Its Ophthalmological Symptoms. By T. R. POOLEY, - - - - -	100
A New Lamp for Skiascopy. By B. E. FRYER, -	106
Acute Glaucoma Associated With Nasal Polypus. Removal of Polypus and Relief of the Glaucomatous Symptoms. By S. C. Ayres, - - - - -	108

INDEX.

iii

A Case of Scirrhus Carcinoma of the Orbital Lachrymal Gland. By J. ELLIS JENNINGS and ADOLF ALT, - - - - -	109
Hæmorrhagic Glaucoma. By ADOLF ALT, - - - - -	114
The Value of Weak Lenses in Moderate Errors of Refraction. By ALBERT E. BULSON, JR., - - - - -	129 -
A Case of Oculo-Motor Paralysis With Scotoma of the Visual Field. By GEO. E. BELLOWES, - - - - -	144
Astigmatism. By D. S. REYNOLDS, - - - - -	150 -
Blepharoplasty. By CH. H. BEARD, - - - - -	161 -
Ophthalmological Testimony in a Medico-Legal Case. By L. R. CULBERTSON, - - - - -	171
Some Observations Upon the Irritating Effects of the Natural Gas Upon Trachoma. By J. J. KYLE, - - - - -	173
Skin-Grafting for Malignancy of the Orbit and Entropion. By F. B. TIFFANY, - - - - -	150
A Case of Mental Depression Apparently Due to a Graduated Tenotomy, and the Use and Limitation of Prisms. By W. H. BAKER, - - - - -	185
Hints on the Hygiene of Trachoma and the Influence of Climate and Altitude in Its Management. By S. M. BURNETT, - - - - -	194
Marked Impairment of Central Vision Following Prolonged Use of the Affected Eye. By SAMUEL THEOBALD, - - - - -	197
Antiseptics and Anæsthetics in Ocular Operations. By JOS. E. WILLETS, - - - - -	200
Keratoconus. By J. W. BULLARD, - - - - -	202
The Technique of Cataract Extraction. By B. E. FRYER, - - - - -	210
Credé's Method for the Prevention of Purulent Ophthalmia in Public Institutions. By LUCIEN HOWE, - - - - -	225
Congenital Nystagmus. By J. E. COLBURN, - - - - -	237
Ophthalmia Nodosa. By G. KNAPP, - - - - -	97
Can Castration and Ovariectomy Cause Optic Atrophy? By L. R. CULBERTSON, - - - - -	252

Hysteria in Ophthalmology. By W. L. DAYTON, -	257
A Senile and Pyramidal Cataract in One Subject. By GEO. F. SUKER, - - - - -	266
* A General Consideration on the Etiology and Treat- ment of Chorioiditis Non-Suppurativa. By W. E. DRIVER, - - - - -	275
On Retarded Closure of the Wound, and Some Rare Accidents and Sequelæ of Cataract Extraction. By C. BARCK, - - - - -	281
Cases of Ophthalmia Neonatorum. By F. T. REYLING,	289
Treatment of Certain Corneal Lesions by Hydraulic Curetting With Sublimate Solutions. By T. H. PLEASANTS, - - - - -	294
Syphilitic Amblyopia. ROBT. F. LE MOND, - -	301
Some of the Physiological Factors Contributing To- ward Making the Eye Emmetropic. By E. S. HEISIG, - - - - -	304, 331
The Ophthalmometer as a Guide in Subjective Opto- metry. By G. J. BULL, - - - - -	311
A New Instrument. By CH. H. BEARD, - - -	319
On the Primary Causation of Asthenopia—Influence of Fatigue. By WILL WALTER, - - -	321
A Plea for More Mild Treatment of the Conjunctiva. By E. W. AMES, - - - - -	337
Subconjunctival Injections of Sodium Bichloride Solu- tion in the Treatment of Iritis, Keratitis, Cyclitis and Choroiditis. By S. L. LEDEETTER, - -	342
Subconjunctival Injections of Bichloride in the Deep- Seated Disturbances of Myopia. By FR. S. KEL- LOGG, - - - - -	345
A Case of Optic Nerve Atrophy Treated by Inhala- tions of Nitrate of Amyl. By CH. W. KOLLOCK,	347
The Etiology and Treatment of Exophthalmic Goitre. By J. F. CLARKE, - - - - -	349
Scopolamine Hydrobromate as a Mydriatic and Cyclo- plegic. By WM. S. FOWLER, - - - - -	350

INDEX.

The Effect of Intense Flashes of Electric Light Upon the Eye. By DUNBAR ROY, - - - -	353
Can We Prevent Color-Blindness by Education of the Color-Sense in Infancy? By L. R. CULBERTSON, -	361 ♥
Operation Intended as Substitute for Extirpation of Lachrymal Gland or Duct. By J. J. KYLE, -	368
Cases From the Clinic. By HENRY DICERSON BRUNS, -	371

CLINICAL MEMORANDA.

Two Cases of Atrophy of the Optic Nerve After Typhus Abdominalis; One Due to a Debilitated Condition, The Other to Meningitis. By ADOLF ALT, - - - - -	46
Case of Synchysis Scintillans With Normal Visual Acuity. By ADOLF ALT, - - - - -	47
Lack of Orbital Fat, Congenital Microphthalmus, Persistent Pupillary Membrane and Fœtal Tissue in the Vitreous Body. By ADOLF ALT, - -	48
A Case Illustrating the Efficiency of Subconjunctival Injections. By F. C. TODD, - - - - -	157
A Case in Which Subconjunctival Injections Were Not Efficient. By F. C. TODD, - - - - -	158
A Case of Nocturnal Epileptiform Convulsions Relieved by Controlling a Spasm of Accommodation. By F. C. TODD, - - - - -	159
A Piece of Steel in the Vitreous Body Located by Ophthalmoscopy and Removed With the Electro-Magnet. By F. C. TODD, - - - - -	159
A Case of Complete Uræmic Amaurosis. By O. WILKINSON, - - - - -	255

CORRESPONDENCE.

To the Members of the Medical Profession, - -	15
---	----

SOCIETY PROCEEDINGS.

Pan-American Congress at Mexico City, - - -	17
Ophthalmological Society of the United Kingdom, -	24, 86
Western Ophthalmological, Otological, Laryngological and Rhinological Association, - - -	49

OPHTHALMIC DIGEST.

Ophthalmic Digest. By J. ELLIS JENNINGS, - -	28, 52
--	--------

MISCELLANY.

Miscellany, - - - -	62, 63, 64, 96, 156, 160
---------------------	--------------------------

BOOKS AND PAMPHLETS.

Books and Pamphlets, - - -	32, 96, 127, 256, 385
----------------------------	-----------------------

9262



THE AMERICAN JOURNAL OF

OPHTHALMOLOGY.

VOL. XIV.

JANUARY, 1897.

NO. 1.

ORIGINAL ARTICLES.

CASE OF QUININE AMAUROSIS; OBSERVATIONS EXTENDING OVER TEN YEARS.¹

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

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CHARGE OF THE EYE DEPARTMENT, EYE, EAR, NOSE AND THROAT
HOSPITAL, NEW ORLEANS, LA.

PATIENT, S. P., white female, aged 3 years, was sent to me by Dr. H. D. Hanson, of Donaldsonville, La., on September 30, 1886, with the following history:

About September 18, 1886, patient had remittent fever and September 19 five grains of quinia sulphate were given by the rectum every three hours. "No ill-effects being noticed, it was continued until thirty grains had been taken. On Monday she was free from fever and in excellent condition, but was observed to be blind. The pupils were widely dilated and immobile." (Dr. Hanson's letter).

The little one is a fair, blue-eyed, well-nourished child. The eyes have a vacant stare, the pupils being dilated almost to the maximum and responding very slightly to an artificial light concentrated by a lens. The movements of the eyeballs

¹ Read before the Orleans Parish Medical Society.

are not impeded. The ophthalmoscope shows the optic discs to be very white with the vessels, especially the arteries, small and thin. There are no hæmorrhages or other changes in the fundus. A favorable prognosis is given and the use of strychnia sulphate gr. $\frac{1}{40}$ hypodermatically recommended.

October 2, 1886. Yesterday I thought the pupils a shade smaller, but this was the only change I could detect. To-day the pupils are decidedly smaller and there is undoubtedly light perception. The child shrinks somewhat from the full glare of day, and from my hand swept rapidly before her eyes.

October 3, 1886. Pupils about the same, but I am sure she now recognizes me.

October 4, 1886. Vision about the same; pupils smaller. Allowed to go home.

October 15, 1886. Father of child tells me that her sight came back gradually but steadily; the sight and the pupils now seem to him normal.

November 9, 1886. Dr. Hanson writes to me: "According to request that I inform you as to the final issue of the case of little S. P., whom I sent to you some time ago for quinine amaurosis, I am glad to report that she has entirely recovered. Improvement, which set in rather suddenly, a few days after her return from the city, rapidly progressed to complete restoration of sight."

February 23, 1887. Child was brought to my office to-day. The pupils seemed a little dilated and the ophthalmoscope showed decidedly pale optic nerves with small retinal vessels, HHA's. The mother says the child holds objects very near to examine them and seems sometimes to have difficulty in finding small objects, but she thinks she noticed all this before the attacks of quinine amaurosis, and believes the child to be near-sighted as both she (the mother) and the father are.

July 3, 1888. The pupils are now certainly larger than normal, about two-thirds of maximum I should say. The optic discs are bluish-white and the arteries small. Vision = finger counting at 20 feet. The mother says she does not think the child's sight perfect by any means.

March 2, 1889. No material change.

March 25, 1891. V., R. and L. = $\frac{20}{LXX}$. Appearances unchanged. She holds her books very near.

June 2, 1892. V., R. and L.=²⁰/_{XL} doubtfully.

June 7, 1892. +1° R. and L. ordered for near.

May 2, 1896. After careful examination (under atropine)

R. + 1.50° ax. 105° $\bigcirc$ — 2° ax. 15°;

L. + 1.50° ax. 75° $\bigcirc$ — 2° ax. 165°,

are ordered for constant use. With these, V., each eye=²⁰/_{XL}, both eyes=²⁰/_{XXX}. She can read the finest print when the book is held close—say six inches. The appearance of the fundus is unchanged; the discs are very bluish-white, the vessels small. The pupils may be a third larger than normal, but seem quite sensitive to light.

In this connection it is of interest to relate that I have recently (March, 1895) had occasion to examine the eyes of a gentleman who was a victim of quinine amaurosis in 1878. He, then a boy of 15 or 16, was ill of yellow fever during the last epidemic of the disease in this city, and was poisoned by quinine therapeutically exhibited.

The blindness was total and the pupils widely dilated. To-day the pupils are not noticeably abnormal, but during examination with the ophthalmoscope they certainly remain more open than usual. I venture to say that there is not an ophthalmoscopist living who, if suddenly confronted with this case, in the dark room, would not pronounce it one in the last stages of optic atrophy. The nerves are blanched—a pale, bluish-white, and the vessels very tenuous. Nevertheless, in a good light, with proper correcting glasses (strange to say he also has a regular mixed astigmatism), this patient reads ²⁰/_{XX} readily and the finest print (Sn. No. 1) at the usual distance. I regret I have been unable to measure the fields of vision in these cases. They are doubtless contracted, but the contraction is not enough to make itself felt (subjectively) as an annoyance. Central color perception of red and green is good in both cases.

A CASE OF ENDOTHELIOMA OF THE DURA MATER AND BRAIN.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[*With Micro-Photographs.*]

ON June 5, 1896, H. M., 64 years old, called on me at the suggestion of Dr. W. A. McCandless, of this city, on account of eye symptoms which, combined with other symptoms, were looked upon as, perhaps, furnishing a clew to the site and possible operability of a cerebral lesion.

My record shows that I found on the right side facial paralysis, exophthalmus, miosis of the pupil and atrophy of the optic nerve, quite far in its progress. The optic nerve of the left eye was hyperæmic. This combination of symptoms made the presence of a basal lesion quite probable.

I never saw the case again, nor heard of it, until Dr. McCandless kindly gave me the specimen, which I shall describe in the following.

With regard to the further history of the case I must refer the reader to the following notes, kindly furnished me by Dr. McCandless:

"Henry Müller was a clinic patient at St. Mary's Infirmary a number of months before he entered the Hospital March 29, 1896. When he first came to the clinic he had pain over right side of face and head,—most particularly over the distribution of the superior maxillary nerve. About the time he entered the hospital, eight months after the first symptoms appeared, there was a beginning paralysis of the facial,—a slightly changed expression of the face, and he could not perfectly close the eye. He complained of pain in and about the eye, also defective vision, with slight indications of protrusion of the globe. We then suspected a tumor of the brain, and he was referred to Dr. Alt for examination. The examination revealed atrophy of the optic nerve, and the exophthalmus was thought to be caused by the paralysis of 'the seventh' nerve or by vascular disturbances. Dr. Henderson also examined the eye

and he thought there must be some pressure back of it to cause its protrusion. Although the patient complained of a disturbed condition of the ear, Dr. Barclay, at about this same time, could discover no indications of disease. Soon the inferior maxillary began to show indications of involvement and increasing paralysis. Then an exploratory trephination was made July 1. The membranes were so tightly adherent, as we approached the base of the skull, and the hæmorrhage so profuse that the operation was abandoned. The wound healed kindly, but the patient's condition grew steadily worse; the

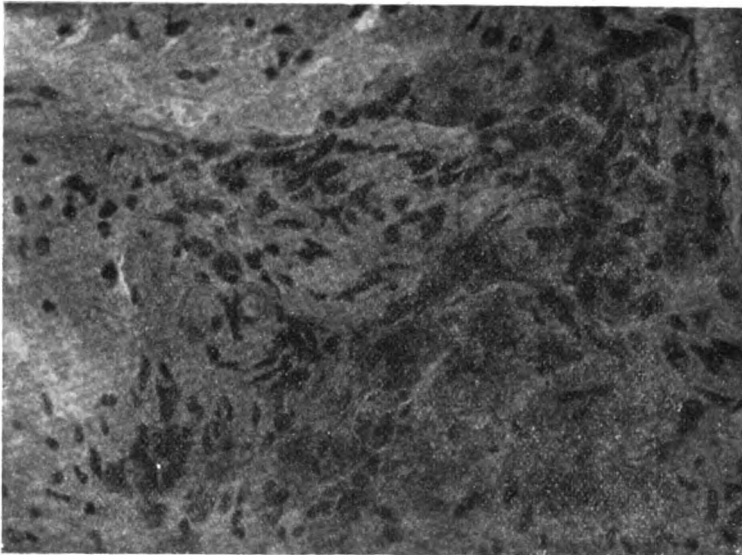


FIG. 1.

paralysis of the muscles, supplied by the facial, and the motor filaments of the inferior maxillary became so complete, that the patient presented a most pitiable aspect. Near the end of his life the pain became very much less; but deglutition became difficult and finally, one week before death, impossible. Patient died July 15, 1896. A post-mortem was made and a tumor revealed, which we were glad to turn over to Dr. Alt, since he had taken great interest in the case."

The specimen which Dr. W. A. McCandless kindly handed to me for examination consisted of the right half of the skull.

The brain was almost all removed excepting a mass of tissue in the temporo-sphenoidal fossa, which was firmly adherent to the dura mater and with it to the bone of the median wall below the sella turcica. The optic nerve, I am sorry to say, had been severed at the intra-cranial orifice of the optic foramen, in front of the chiasma. The eye was in the orbit, its anterior surface had at some time previously been dry. I removed the eyeball and optic nerve carefully for separate examination. Then I removed the cerebral substance, tumor and dura mater from the bone as a whole. This together was about of the size

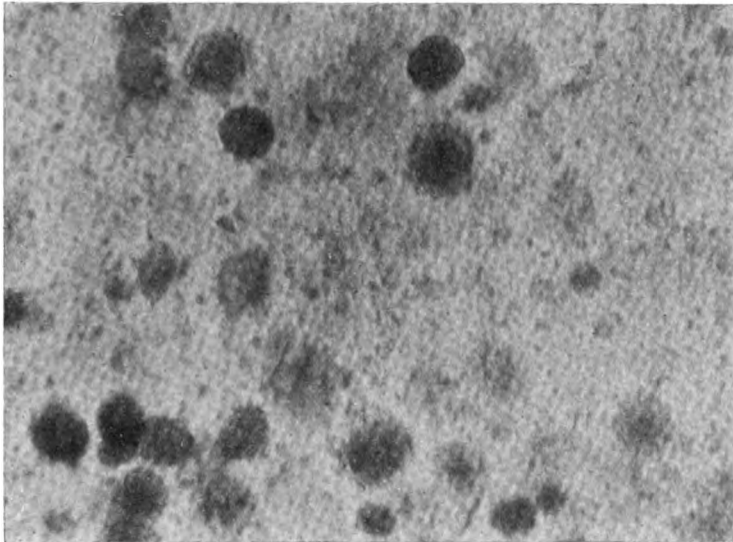


FIG. 2.

of a pigeon's egg or a little more. On cross section the whole mass appeared irregularly lamellated with smaller and larger cavities out of which a dirty, milky fluid escaped. Examination of the skull after the removal of this mass showed that the growth had entered the sphenoid cavity, the pharyngeal vault and the choanæ. As we shall see later on, it had also spread to a small extent through the sphenoid fissure into the orbital cavity. It also involved the origin of several of the cranial nerves. The part of the brain involved corresponded with the gyrus uncinatus and, probably, the gyrus hippocampi.

The origin of the tumor seems to have been in the dura mater. This membrane is swollen to many times its normal thickness. In parts it is firmly attached to the adjacent brain-tissue; here the tumor has spread directly into the latter (Fig. 1). In other parts larger and smaller cavities remain between both tissues which is filled with a grumous, milky substance which easily falls out of the sections.

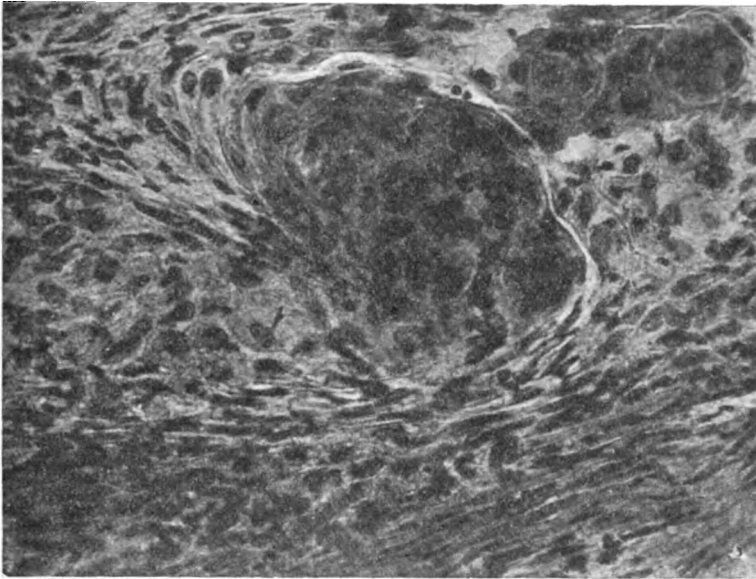


FIG. 3.

With a low power cell-nests and cell-tubules are seen to form the chief parts of the tumor. The tubules spread in all directions exactly as we are accustomed to see in epithelial tumors, but they run particularly along bloodvessels, apparently in their lymph-sheaths. In the brain-tissue, the spreading of the tumor has taken place both directly by contiguity and also indirectly along the bloodvessels. Each one of the latter is surrounded by the elements of the tumor. Where the tumor has entered the brain-tissue and all along in the cortical substance of the portion of the brain examined, an enormous number of round, translucent bodies are seen (Fig. 2), most of which take on a deep stain with hæmatoxyline and aniline dyes.

They vary greatly in size and are darker in their centre and the darker, the larger they are. They must be spherical, therefore, and they have the appearance of colloid or arenoid bodies; they are not amyloid, at least they do not take on the stain like amyloid. Some amyloid concretions are also found, but they look quite different. With a higher magnifying power the elements of the tumor are found to be large, sometimes enormously large, flat cells with a roundish or oval nucleus. These cells are varying greatly as to shape and size. Some are round, some, where they are closely pressed together as in

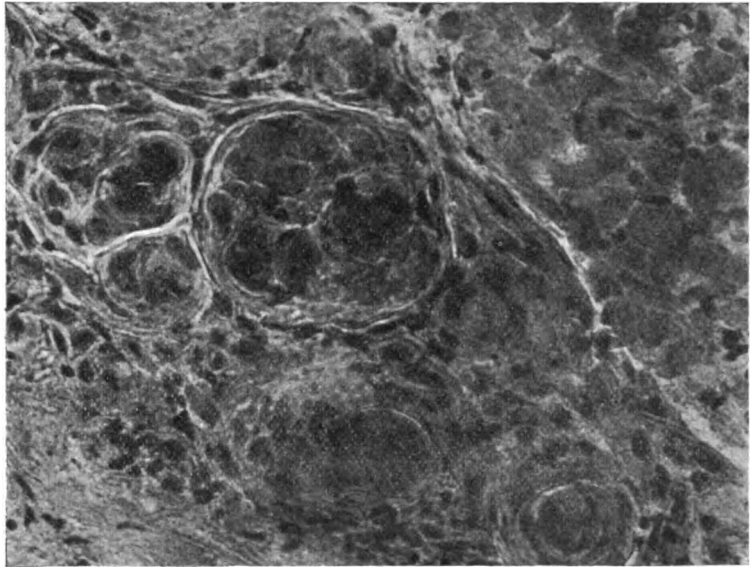


FIG. 4.

the dura mater, are spindle-shaped and bi-polar. They have a great tendency to form pearl-nodules, which sometimes are of an enormous size (Fig. 3). In some of these pearl-nodules the cells are undergoing a colloid or arenoid metamorphosis, or perhaps an amyloid one. In their parts the closely pressed cells have retained their round shape but their protoplasm is dim and the nucleus is either not visible at all or only seen as a sickle-shaped substance at their periphery. This is particularly the case with the cells which fill the smaller and larger cavities mentioned above and which are evidently undergoing a regressive metamorphosis (Fig. 4, right upper corner).

Not only the smaller bloodvessels, but also quite large ones are surrounded by a thick mantle of the cells of the tumor. This condition has in many places caused an enormous hyperplasia of the muscular cells of the bloodvessels, so as to make them appear in transverse sections like large vesicles. In other portions the tumor cells have penetrated into bloodvessels and consequently not only surround but also fill them.

Many of the nuclei of the tumor cells show unmistakable karyokinetic figures.

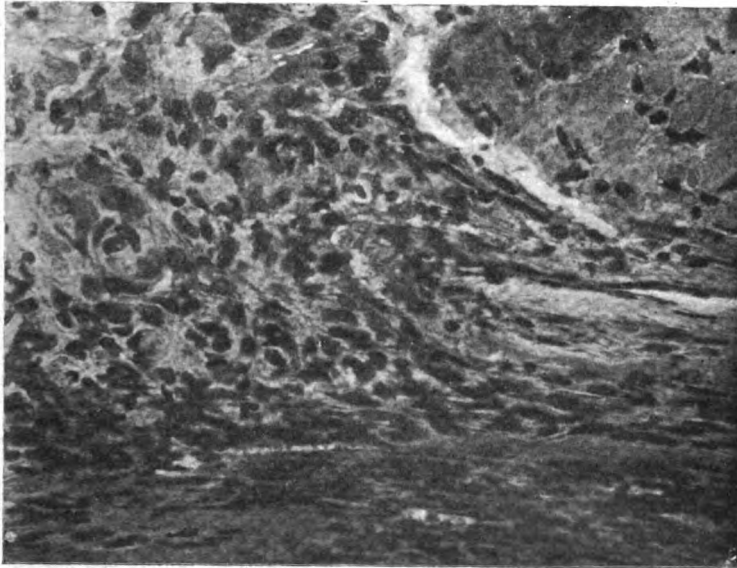


FIG. 5.

The round-cell infiltration usually accompanying malignant tumors is not wanting in the brain as well as in the dura mater (Fig. 5), and there are numerous foci of round-cell infiltration in the tumor tissue itself.

Having examined numerous sections of the tumor, dura mater and brain, I think the tumor is a most beautiful specimen of an endothelioma. Endotheliomata of the brain do not seem to have as yet been observed very frequently.

Bramwell (*Intra-cranial Tumors*, 1888, page 238), speaking of the alveolar sarcoma of the brain, says: "It has also been

described, and not infrequently, as endothelioma. On this view the cell nests arise by proliferation from endothelial cells. This certainly happens when masses of cells are found from the endothelial covering of the subarachnoid mesh-work of the pia mater; the masses afterwards group themselves into "nests." Sometimes the proliferous endothelial cells of the pia mater are aggregated into small spherical nodules of a peculiar lustrous appearance. The tumor into which the membrane is transformed then contains small, shining, pearly bodies made up of laminated layers of squamous or tubular cells. Such tumors have been called cholesteatomata or pearly tumors."

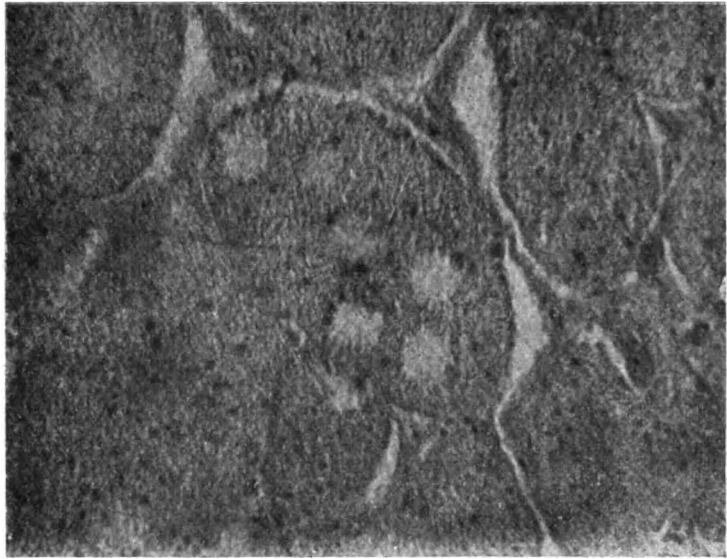


FIG. 6.

Drs. L. Bremer and N. B. Carson, of this city, published a case of "Cylindroma Endothelioides of the Dura Mater" in the *American Journal of the Medical Sciences*, February, 1895, which, where the tumor was well developed (see their Fig. 2) corresponds exactly with the one here under consideration. Dr. Bremer sees the origin of the tumor in his case in the endothelia of the bloodvessels.

What endothelial cells have given rise to our tumor, it is impossible to tell with certainty. Yet there are endothelial cells in the lymph- and bloodvessels in these tissues aside from those of the "subarachnoid mesh-work of the pia mater" which may serve as the starting point for an endothelioma. I am inclined to the belief that in our case the tumor started in the dura mater and probably in the endothelial cells of the lymph-sheaths of the bloodvessels. This at least seems to be suggested by its manner of growth.

The optic nerve of which I made a large number of transverse sections is atrophic throughout. Throughout its whole extent it contains a large number of round openings (Fig. 6) which at first look like empty cavities.¹ With high powers these usually perfectly round cavities, which give the nerve a sieve-like appearance, are seen to contain a slightly granular substance probably nerve tissue débris, and in a number of the sections this substance has taken on a light tint from the staining-fluid. These structures then appear like the round arenoid or colloid bodies in the brain, but they never take on as deep a tint. There are also some smaller colloid-like round bodies with a deeper stain, which may be traced for quite a distance, even into the nerve-fibre layer of the retina. As the deeply-stained bodies are throughout much smaller than the apparently empty or but lightly stained cavities, they do not seem to be identical. There are also a number of amyloid bodies situated in the pia mater and arachnoid sheaths.

The tumor has entered the orbit at its apex with the nerves and bloodvessels through the sphenoid fissure, but only to a small extent. Here it forms an apparently isolated nodule of the size of a split pea, which shows the same microscopical structure as the tumor does elsewhere.

¹ In the supplementary number to Volume XXXIII of *Knapp's Archives* (German edition) on Table XVI, Fig. 5, Dr. A. Elschnig has given an illustration of this same condition in the optic nerve of an eye with glaucoma. The patient had died from a cerebral tumor. In describing the sieve-like appearance of the optic nerve, he states that he has never seen it in optic nerves from cases with cerebral tumors, but in glaucomatous eyes he has found this appearance of the optic nerve quite frequently. To this I wish to state, that in all my examinations, this is, as far as I remember, only the third case, in which I have seen this appearance of the optic nerve and none of these was a case of glaucoma. In all three cases the optic nerve was atrophic.

The dura mater sheath of the optic nerve has for quite an extent become agglutinated to the pia mater in consequence of a plastic inflammation which has led to the extensive new-formation of connective tissue. While in the transverse sections of this portion there is on one side this firm adhesion and obliteration of the inter-vaginal space, on the other, diametrically opposite side, the inter-vaginal space is considerably enlarged, and the trabeculæ which in the norm pass loosely from the one sheath to the other are very much stretched and many of them have been torn by the pressure of this apparently dropsical condition.

Quite unexpectedly I found that the anterior portion of the eyeball which, as stated, at some time previously to my receiving the specimen had been dry, was also the seat of pathological changes. Iris and crystalline lens are pressed forward, so as to be almost in contact with the posterior surface of the cornea. At first I thought the changes simply to be due to the drying up of the aqueous humor. On section, however, I found that a posterior synechia had at one time been formed, between the time of my seeing the patient and his death. This synechia was almost circular.

The cornea and conjunctiva are filled with round cells. In the conjunctiva this infiltration is especially marked around the bloodvessels. Descemet's endothelium is partly absent, partly proliferating. All along the inner surface of Descemet's membrane lie pigment granules some enclosed in cells, most of them free. Their origin seems to be the iris, as the tissue of this membrane is almost devoid of pigment, except in its retino-choroidal layer. Besides the common senile changes the tissue of the iris and ciliary body show an enormous round-cell infiltration. The cells of the retinal layer of the ciliary body in its pars nonplicata are beginning to proliferate. The periphery of the retina shows the well-known cystic degeneration. The choroid is apparently normal.

How and when this inflammation of the anterior part of the eyeball took place, I do not know.

QUININE AMBLYOPIA.

BY S. C. ARYES, M.D., CINCINNATI, OHIO.

THE following case of quinine amblyopia occurring in a girl 7 years of age, is of interest, as this profound influence of quinine is seldom witnessed. She had generally enjoyed good health, having suffered only from diseases incident to her age. For two weeks or more she had some increased temperature and it was feared she was threatened with typhoid fever, but the characteristics of this disease did not develop. Then she had an eruption of chicken-pox and during this time her temperature ran very high. Her physician gave her large doses of quinine for three days as follows: The first day 24 grains; the second day 56 grains, and the third day 26 grains. After the last dose she became unconscious and remained so for two or three days.

After return to consciousness it was observed that she was totally blind. This condition lasted for only a day when vision began slowly to return. For a while she complained of the room being dark when it was in fact quite light. Later on it was observed that her color sense was impaired. When examined by me two months after the above attack had occurred I found both optic discs pale and vision 0.6 in each eye. Color sense seemed to have returned and she had the appearance of being in good health.

She took in the space of three days 104 grains of quinine, quite a large amount for one of her age. It produced a profound influence on her brain as is evidenced by the unconsciousness for a period of two or three days. Unfortunately its influence on her hearing was not noted.

Dr. de Schweinitz, in the "Transactions of the American Ophthalmological Society," 1891, reports some very interesting experiments he made on the influence of quinine on dogs.

He found that injections of from one to four grains to the pound produced blindness in from three to fourteen hours, and one dog died from the effects of three grains to the pound.

The influence of the drug on the retina and optic nerve was very similar to that on human beings.

He gave some original plates showing the microscopic changes in the retina and optic nerve.

He says in *résumé* "that we have thickening and changes in the walls of the vessel (endo-vasculitis), organization of a clot, the result of thrombosis, widening of the infundibulum of the vessels as the result of the constriction of the surrounding nerve fibres, presenting appearances not unlike a glaucomatous excavation, and finally practically complete atrophy of the visual path including the optic nerves, optic chiasm, and optic tracts as far as could be traced."

ILLUMINATION OF THE JAVAL ASTIGMOMETER.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU FOR SOUTHEASTERN OHIO; OCULIST TO CITY HOSPITAL, B. Z. & C., AND C. & M. V. R. R., ETC.

I FIRST desire to call the attention of ophthalmologists to the fact that the fine black line on the mires of the Javal-Schiötz Ophthalmometer (model 1889) is too narrow for accurate work, even though the most brilliant light be reflected upon it. This line is only one millimeter wide and it is enough to make a difference of .5 D. in results found, owing to the spasm induced in the ciliary muscle of the operator in trying to adjust the instrument so that these two black lines will be continuous in the meridian of greatest or least curvature.

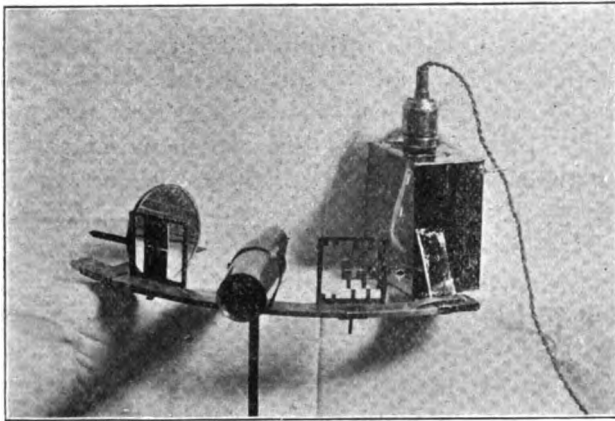
Several years ago the writer noticed errors from this cause in using the instrument and had a black line painted on each mire and running through its center which was 5 mm. wide. With this width and even a feeble illumination the mires could be quickly and accurately adjusted to the proper axes.

The Hardy instrument has a wide line (I do not remember its width) which makes it a very accurate instrument.

The writer has been using on his machine for a year an invention of Mr. John H. Culbertson which illuminates the mires brilliantly and cheaply. It consists of an enameled

hood containing a 16 or 32 candle power electric incandescent lamp attached to a drop cord from the street circuit. This hood is screwed on the brass rotating bar and moves with it. This hood reflects part of the light onto the stepped mire and part to a concave mirror which is placed on the brass bar of the opposite side and from whence it is reflected onto the square mire. The one light will do the work of four, thus cheapening the cost of light by three-fourths. This is particularly desirable in places where they charge so much a month per light.

The following cut roughly illustrates the invention of J. H. Culbertson.



Wellsbach gas light gives a splendid illumination if parabolic reflectors are used, both light and reflectors being placed on the chin rest, as in the apparatus made by Fox and Strendicke, of New York.

CORRESPONDENCE.

TO THE MEMBERS OF THE MEDICAL PROFESSION.

Editor AMERICAN JOURNAL OF OPHTHALMOLOGY — I would be pleased to have an expression from you, either personally or through some medical journal, as to the relations of the lay-

publishing firms of medical journals and the profession. The request is suggested by the fact that Messrs. Wm. Wood and Company, of New York, refuse to permit the editors of "The American Year-Book of Medicine and Surgery" to use in our abstracts of Medical Progress articles and illustrations first printed in the *Medical Record*, and the *American Journal of Obstetrics*.

This decision seems to me to be wrong for the following reasons :

1. IT PREVENTS THE DISSEMINATION OF MEDICAL KNOWLEDGE. The Year-Book condenses, systematizes and criticizes the year's medical work in a shorter space and more permanent manner than the journals, and has thousands of readers no single journal can claim, or hope, to reach. Every physician writes and publishes articles in order that every member of the profession may, if possible, learn of his work, and that science and progress may thus be furthered and humanity benefited. To interfere with such dissemination of our literature in reputable publications is, I think, discourteous and unjust to the profession and an injury to Medical Science.

2. This injustice and injury to Medicine become all the more striking when physicians do not receive a cent of pay for contributions, from the publication of which the lay-publisher is supposed to make considerable financial profit.

3. No other publishers in the world, not even those who pay authors for their contributions, have in the least objected to our reproduction of quotations, abstracts, and illustrations from their journals.

Do you wish to limit the dissemination of your contributions to Medical Science by such an exclusion of them on the part of publishers from reputable publications? *Is this literature the property of yourself and of the profession or not?* Does your gift of it to a journal make it the private property of the publishers of that journal? Is it not rather a loan for temporary use only?

Will you not hereafter demand that there be printed with your article a statement that the right of abstracting the text or reproducing illustrations is guaranteed?

Philadelphia, Pa., December, 1896.

GEO. M. GOULD.

SOCIETY PROCEEDINGS.

REPORT OF THE SECTION OF OPHTHALMOLOGY, PAN-AMERICAN MEDICAL CONGRESS, HELD AT MEXICO CITY, NOVEMBER, 1896.

FROM NOTES KINDLY FURNISHED BY ROBERT SATTLER, M.D.,
CINCINNATI, OHIO.

The meeting of the Ophthalmological Section of the Pan-American Medical Congress, held in the City of Mexico, November 16, 17, 18 and 19, 1896, under the able and courteous direction of Dr. Jose Ramos, represented one of the most successful re-unions of Spanish-American and American ophthalmologists.

The attendance on the part of North American oculists was small, but the Spanish contingent from Mexico, Central America and South America was a large one.

The papers read by those in attendance excited active general interest and brought out many novel points of practical and scientific importance.

The discussions were carried on in Spanish and French. The President, Dr. Ramos, after a brief address of welcome to the members and assembled foreign colleagues, opened the work of the Section and outlined a provisional programme.

The Treatment of Burns of the Conjunctiva. By DR. D. C. BRYANT, Omaha, Neb., was the first paper read.

The treatment of these cases depends upon the amount of surface involved and consequently in this paper is divided into two distinct methods, the first used in the milder cases and the second in the more severe ones.

Many of the cases of burns of the conjunctiva seen in my own practice are produced by hot metals and are circumscribed in area. In these cases, as soon as the sloughing and separating of the dead tissue is completed, I pass a strabismus-hook

under the conjunctiva around the edge of the wound breaking up the loose connection between conjunctiva and eyeball to such an extent, as to allow the bringing together of the edges of the wound. The wound is then closed over by stitching the edges of the conjunctiva together with fine silk sutures and the case is treated as any ordinary wound of the conjunctiva would be.

The rapid healing of the ocular conjunctiva when thus treated, shuts out any possibility of that much-to-be-dreaded result, union between the ocular and palpebral surfaces.

The second method is employed in the cases where the burnt surface is so large as to prevent the use of the first method. This method consists in the early use of the skin-grafts, not waiting for the third stage as formerly recommended, but employed at the beginning of the second stage.

At the request of the President, Dr. Sattler gave first a brief synopsis of Dr. Bryant's paper in French and Dr. Redmond followed in Spanish.

DR. SATTLER opened the discussion (in English) and said that Dr. Bryant had presented a subject of great practical interest. His experience with burns of the conjunctiva had not been so favorable, except with those cases in which only the superficial layers were involved. In others in which the mucosa is destroyed, and in which sphacelation of its entire thickness and even of the submucous, episcleral and scleral tissue results, it has been rather uniformly unfavorable. This has been the case even in spite of careful separation and interposition of plates of rubber or ivory, the transplantation of mucous membrane from the mouth of the patient and of conjunctiva from the eyes of animals.

Symblepharon almost invariably resulted in such cases, which a subsequent plastic operation would only relieve imperfectly. He has never had any success with the transplantation of the other mucous membranes of man, or of the conjunctiva of dogs or rabbits.

DR. BRYANT stated, that he had tested this method and found it superior and giving better results than other methods of treatment.

Malignant Sarcoma of the Orbit. By ROBERT SATTLER, M.D., Cincinnati, Ohio, (in English).

At the President's request he gave a brief synopsis of it in French.

He emphasized the conclusion of his paper by saying that sarcomatous disease commencing as a sub-periosteal growth is one of the most malignant and dangerous neoplasms found in the orbit and that early adult life and childhood are the two periods of life during which it is most common. It is fortunately a rare disease. Equally dangerous are the gliosarcomatous growths which start as intra-ocular neoplasms but rapidly become extra-ocular ones. They also grow with startling rapidity. Only one variety of malignant sarcoma, the encapsulated one, offers a chance that surgery may afford relief. All other varieties are hopeless and singularly fatal; more rapidly so with surgical or other interference, than without it.

The paper was discussed in Spanish by Drs. Ramos, Santos Fernandez and others.

In reply to the question from Dr. Fernandez: "Did I understand Dr. Sattler to say that this is a frequent disease in his country?" Dr. Sattler stated that fortunately it was not frequently met with, but by chance it had been his misfortune to meet with a number of such cases.

Observations With Respect to Orbital Osteo-Periostitis. By
JUAN SANTOS FERNANDEZ, Havana, Cuba.

He related 28 cases of orbital periostitis which he had observed during a period of twenty-one years and in attending on 30,500 eye patients in a private clinic. In his ophthalmic practice he finds a smaller number of these cases of disease of the orbit, than is generally given as the proportion by other observers.

He recognizes the difficulty of diagnosing osteo-periostitis at the first glance and considers the disease as the final result of lymphatism or syphilis; the latter of the two being the easier cause to combat. The profession should, as soon as possible, arrive at the clear understanding of the etiology of this disease, as a syphilitic osteo-periostitis rapidly yields to treatment. The prolongation of the disease of the bones of the orbit and its propagation to the eyelids always gravely menaces the cornea and may cause loss of vision.

He thinks that orbital periostitis is only observed with more or less frequency amongst the very poor classes, who,

through want of timely care and good nursing, often lose their sight.

In his cases the infection never came from the frontal sinus, notwithstanding that fact that this is the starting point of many inflammations of orbital walls. He can designate as a more frequent point of origin the antrum of Highmore, through propagation from the dental alveoli. He has also seen the disease start from the nasal fossæ.

Through the relief obtained and the shortening of the process of osteo-periostitis, he recognizes the importance of the prompt expulsion of the secretions when caries is formed. In order to maintain this he recommends dilatation of the fistula by means of a stalk of *laminaria digitata*, which he allows to remain *in situ* up to twenty-four hours.

The author gave an account of 14 cases of autoplasty performed to restore either the upper or lower lid. Of the three methods of autoplasty, that of sliding the flap, that of employing the adjoining flap, and that of using a distant flap, he prefers the first two. He recognizes greater advantages in the first one, but also admits that the second one adapts itself well to many cases. Dermic grafts, he thinks, should be reserved for very special cases.

In order to succeed with blepharoplasty, he thinks it indispensable to give a perfect mobility to the free edge of the affected lid, when it is still in existence, in such a manner as to be able to close the two eyelids before the flap is applied. He believes in making blepharoplasty in two operations. In the first one he breaks the adhesions of the everted or contracted lid and closes the lids. In the second operation he applies the flap to the resulting solution of continuity. With respect to the flaps, he considers that the indications of the text-books specifying determined proceedings for general practice are not to be trusted, and that the region from which the flaps are to be taken and their form have to be adapted to the lesion and its configuration in each case.

He only recommends the use of the fronto-nasal flap (as coming from a very vascular region) for certain retractions or ectropium of the inner half of the lower eyelid; as, should any retraction take place in the flap, it would go from the lower to the upper part and would favor the suspension of the lower lid.

He considers, that blepharoplasty very seldom completely

satisfies the requirements of æsthetics, but it always tends to protect the eye and to prevent loss of sight.

The discussion, in which Dr. Sattler and others participated, showed that Dr. Fernandez' experience is at variance with that of North American and European surgeons.

In all cases of chronic caries with fistulous communications, a free exposure of the seat of the disease followed by the removal of all necrosed and carious bone suggests itself as an indispensable necessity. Little or nothing can in these cases be achieved by dilatation of the fistulous tracts, even though it be granted that better drainage be obtained. While he never found the frontal sinus to be the starting point of the disease, and considers the maxillary sinuses to be frequently its source, caries and necrosis of the orbital walls are in the United States very often found associated with and dependant upon pathological processes in the frontal sinus and the anterior and middle ethmoidal cells, while the lesions of the maxillary antrum are also frequent.

A contribution by Frank S. Milbury, M.D., of Brooklyn, N. Y., on *Insufficiency of the Ocular Muscles*, and one by Dr. Teofila A. Moret, of Buenos Ayres, were read by title.

The Treatment of Trachoma by Injections of Permanganate of Potassium Into the Fornix, and Studies Concerning Some Palpebral Autoplasties. Two papers (in Spanish). By DR. FERNANDEZ, Havana, Cuba.

In his contribution on the treatment of granular lids with injections of permanganate of potassium, Dr. Fernandez' large experience and researches have added another method of treatment for this always unmanagable and interminable affection. An objection to this method seems to be the severe pain which attends the injection. This may, however, be modified by cocaine.

Discussion in Spanish by Drs. Ramos, Chavez, Vertiz, Uribe, Froncosa and Sattler.

Enucleation of the Eyeball With Presentation of New Instruments. (Blunt-pointed curved scissors to detach the conjunctiva, single blunt-pointed curved scissors for taking up and cutting the muscles, and syringe for post-bulbar and

intra-orbital injections of cocaine). By DR. CHAVEZ, of Mexico City.

He resorts to cocaine by instillation and, after the muscles have been separated, he injects by the aid of the syringe he has devised a 2 per cent. solution of cocaine into the tissues behind the globe, so that the division of the optic nerve and other structures can be done without suffering. He has never seen toxic disturbances and has found the use of his new scissors of great advantage.

The paper was read in Spanish and English, the discussion took place in English and French.

DR. SATTLER stated that he always practiced the old Bonnet method and could readily see the advantage of the one new pair of scissors with the curved blunt point which serves the double purpose of a hook and cutting instrument. The only objection he could see to it, is the difficulty of guiding and manipulating this combined hook and scissors with the thumb and fingers. We have had various devices of narrow blunt-pointed scissors, but Dr. Chavez, suggestion of having one blunt-pointed curved blade, as far as his knowledge goes, is new. It will enable the operator who practices the Bonnet method to dispense with the hook, and, if the Vienna method is practiced, it will facilitate the division of the tendons of the muscles. We are surely indebted to Dr. Chavez for this modification, as it will simplify further the technique of this operation. So far as the use of cocaine or local anæsthesia is concerned, and the intra-orbital and post-bulbar injection of it, Dr. Sattler confessed to certain misgivings as to its efficacy and he fears its danger. He has had two unpleasant experiences attending the deep and subconjunctival injection of cocaine in enucleation of the eye and prefers general anæsthesia, even with all its dangers, to the annoying, not to say dangerous, sequences which he has met with after cocaine injection in the cases referred to.

DR. CURRY, of Los Angeles, Cal., expressed his approval of the scissors presented by Dr. Chavez.

DR. RAMOS announced as a subject for discussion, *Hernia of the Iris after Cataract Extraction and Methods to Avoid This Complication.*

This called forth some remarks by Dr. Vertiz who thought

that his method of operating might avoid this complication as also the formation of secondary cataract.

A New Operation for Cataract. By DR. VERTIZ. Discussed in English French and Spanish.

DR. SATTLER said, he had been greatly interested in the novel and ingenious method of cataract extraction of Dr. Vertiz. It necessitated, however, a more complicated technique and inflicted a greater traumatism than the methods ordinarily practiced by ophthalmic surgeons entail. This objection, he feared, would probably prevent its adoption, even as a substitute in certain favorable cases, for other operative procedures which are at present in general favor are upheld by experience.

DR. RAMOS read an interesting communication (in Spanish) on *A Brief Study on Astigmatism in Mexico*, which was discussed by Drs. Chavez, Chæon, Montana, Fernandez, and others.

DR. CHAVEZ read an interesting *résumé* of the *Progress of Ophthalmology*.

DR. EMILIA F. MONTANA read a carefully prepared contribution on *Coreskiagraphy*.

DR. REDMOND showed some beautiful pathological specimens.

DR. GEO. J. STEVENS' and DR. TANGEMAN's papers were not read as these gentlemen were not present.

DR. URIBE TRONCOS presented several photographs of a remarkable case of injury of the face and eyelids by a sabre cut. Extensive plastic operations with skin grafting were resorted to and an excellent result obtained.

After this the meeting adjourned and farewell remarks were made by Drs. Ramos, Santos Fernandez, Chavez, and finally Dr. Sattler closed the session with a few brief remarks, thanking Dr. Ramos and his colleagues for the many kindnesses extended and expressed the wish that an equally pleasant and profitable re-union might take place in Caracas, Venezuela, the meeting place of the next Pan-American Medical Congress.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED
KINGDOM.

CLINICAL EVENING.

EDWARD NETTLESHIP, F.R.C.S., President, in the Chair.

THURSDAY, DECEMBER 10, 1896.

Superficial Choroido-Retinitis of Peculiar Form and Doubtful Causation. This case was shown by MESSRS. HOLTHOUSE and BATTEN.

A young woman was first seen in October, 1896, with a history of slight dimness of sight of five weeks' duration. There were very numerous white rounded patches in the fundus, very closely scattered over the whole central region, including the yellow spot, some of them very minute, others about the size of the diameter of a retinal vessel. In many places several spots had coalesced forming larger areas. There was no pigmentation around them. Vision was $\frac{6}{12}$ in each eye. There was no appearance or history of syphilis, congenital or acquired. She presented symptoms of marked Graves' disease. She was one of twenty-four children, twenty of whom had died in infancy of some cerebral disease. There had been no consanguinity of parents, but the case suggested some nervous affection like retinitis pigmentosa. The condition had undergone no change to the present time.

DR. JAMES TAYLOR said, on the question of inheritance, that the girl was the offspring of a very prolific marriage; it was remarkable that in Friedreich's disease, and he believed also in Leber's disease, there was a common history of prolific marriages.

Sudden Failure of Vision in Both Eyes With Total Obstruction of Fundi in a Young Healthy Man. This case was shown by DR. BATTEN.

A man aged 26, was engaged in moving hay in July, when he was seized with sudden giddiness and failure of vision. The

pupils were equal and active to light. In the right eye no view of the fundus could be obtained; there was a grey reflex only. In the left there was also much haze of vitreous, but some white patches could be seen in the fundus but not definitely located. At the present time in the right there was a large white patch in the macular region, and others in the periphery, probably choroidal; in the left some white patches could be seen. There was no history or appearance of syphilis; he was a robust healthy man; he had had no bleeding in other organs. The cause was probably a hæmorrhage brought on by stooping.

THE PRESIDENT thought it probably belonged to the group of large spontaneous hæmorrhages occurring in young adults, one feature of which was their liability to recur.

MR. GUNN thought the changes in the yellow spot were suggestive of deep retinitis of renal origin.

Essential Shrinking of the Conjunctiva, With a Bacteriological Examination. This case was shown by MR. A. QUARRY SILCOCK.

A girl, aged 8, was admitted to Moorfields Hospital on November 13, 1895, with conjunctivitis and infiltration of the cornea. The conjunctiva was extremely hyperæmic and generally œdematous; moist flattened papillary growths projected from the tarsi of both upper and lower lids; the right cornea was clear, the left infiltrated. There were sores and scabs about the anterior nares, and it was supposed that these had been the source of contagion for the eye. The left cornea perforated, and the eye was excised. On March 24, 1896, the patient was re-admitted. There was much thickening and shrinking of the conjunctiva; the lashes were inverted; there was some ulceration of the cornea. Early in May there was some obstruction to the air passages, and the patient coughed up a large hard mass of membranous exudation. By June 6, the left socket had become obliterated; the right cornea was opaque. The aim of treatment had been to disinfect the conjunctival sac, but it had not succeeded. At the present time the left socket was completely shrunken, and there was only a narrow opening between the lids; the right cornea was opaque, the conjunctiva contracted, and the V. = p. l. The case had been examined bacteriologically by Mr. Plimmer.

MR. PLIMMER said that the bacteriology of pemphigus was scattered but uniform; the same organism has been repeatedly found. The one gap in the chain was owing to the impossibility of making the organism grow on any animal's skin. The organism was a micrococcus which grew in pairs; it grew in serum or glycerine agar at incubator temperature. He had injected some of the fluid from one of the blisters on the skin in this case into the peritoneum of a mouse, which died of acute septicæmia; a guinea-pig died forty-eight hours after it was injected into the pleural cavity. A small drop was inserted into a rabbit's eye; after two days there was intense inflammation and discharge, the eye was more rapidly destroyed than with other septic organisms. The suppuration was not produced by a strepto- or staphylococcus, nor by any skin organism. It was identical with that which had been already found by other observers.

MR. MALCOLM MORRIS said that there was the greatest controversy now going on as to the nature of the disease producing bullæ. The cases in which the eye was involved differed from true pemphigus, so that it was not at all easy to be sure of the nature of this affection. He did not think it was a true pemphigus.

MR. DEVEREUX MARSHALL also spoke.

Retinal Detachment of Obscure Origin. This case was shown by MR. SILCOCK.

The patient was a boy, aged 10. When first seen early this year there was a localized detachment of the retina just outside the yellow spot, which steadily enlarged till August. Under an anæsthetic he punctured the swelling through the sclerotic at its summit, with the help of the ophthalmoscope; a choroidal reflex was seen through the rent so produced, and much fluid escaped. The rent closed, the fluid was reformed, and some separate areas of choroidal exudation were now seen. The eye was said to have been always defective. There was no history of injury.

MR. LAWFORD had had a case recently in which there was a large detachment of the retina of obscure origin; he had punctured it and let out serous fluid, but without result as regards the detachment.

THE PRESIDENT suggested retinitis proliferans as the probable nature of the affection.

MR. SILCOCK said that retinitis proliferans had been suggested by Mr. Holmes Spicer, who had first seen the case.

MR. HOLMES SPICER said the case presented many of the characters of retinitis proliferans, but the main central part of the attachment was very prominent and rounded; he thought the detachment might be caused by a cysticercus.

Cases and Specimens.

A specimen of "Melanotic Sarcoma of the Orbit" was shown by MR. R. WILLIAMS. The patient was a woman, aged 40; she had chronic irido-cyclitis, for which the eye was excised. Four or five years later the artificial eye which the patient wore began to squint inwards. It was found that there was a melanotic sarcoma growing from the optic foramen. It had probably originated from the choroid in the first place.

MR. LONG showed "Epithelioma of the Cornea and Conjunctiva in a Man."

MR. MARSHALL had examined a small piece of the growth (a white raised mass at the inner side of the cornea), but had found it inconclusive.

THE PRESIDENT thought it scarcely typical of epithelioma; it looked more like sodden epithelium.

DR. BRONNER showed a drawing of a case of "Coloboma Lentis" upwards and outwards in a man aged 35. There was no history of a blow; he thought it was probably due to some intra-uterine lesion.

MR. CRITCHETT had lately under his care a woman aged 38 who had double congenital coloboma of the iris, dislocation of both lenses and coloboma of the right lens.

MR. TREACHER COLLINS and MR. STOKER showed a case of "Corneal Ulcer Treated with Oxygen." The ulcer got well under the treatment. Mr. Stoker described the method, which consisted in passing equal parts of oxygen and purified air into a mask, which was first fitted over the eye, so that the eye remained exposed to the mixed gases. The mask was worn day and night.

MR. LAWFORD showed a case of "Embolism of the Central Retinal Artery." The patient was a man aged 37. The left eye failed suddenly.

DR. DOYNE showed a case of "Pigmented Growth of the Conjunctiva." A portion of the growth was removed. This was followed by increased pigmentation, which had since diminished.

MR. BICKERTON showed a "Combined Nasal Style and Probe."

MESSRS. CRITCHETT, ERNEST CLARKE, PRIESTLEY SMITH, and WILLIAMS and DOYNE also spoke.

DIABETIC IRITIS. HERSCHEL FISHER, M.D., Lebanon, O.
(*Cincinnati Lancet-Clinic*, November 21, 1896).

On May 19, 1896, I was called to see the Rev. C. P., who complained of an increasing congestion of the conjunctiva due as he thought to smoke or dust of railway travel. The injection, lachrymation and slight photophobia suggested conjunctivitis and a careful search for a foreign body was instituted, but without result. Upon further questioning found that he was a victim of diabetes for a dozen years or more and that lately he had lost weight rapidly. This suggested further examination and close inspection showed a hazy, yellowish discoloration of the iris and a cloudiness of the pupil. Vision of that eye was much impaired. The pupil was small and sluggish.

I instilled a weak solution of atropia and as there was no response the dose was doubled. Returning the next morning and finding that there was scarcely any dilatation of either pupil, I began dropping a 1 to 60 solution into both eyes every ten minutes. There had been a steady increase in the amount of exudation into the pupil, the photophobia was much more marked, vision greatly diminished and the right eye had become involved. The strong solution was used regularly every ten minutes for half an hour, and once or twice during the following half hour without marked effect on the pupils. Questioning confirmed the supposition that he had suffered from previous slight attacks and that there were firm posterior adhesions, the result of former inflammation. A test of the urine was made, and sugar was found in large but undetermined quantity. The specific gravity was then 1034. The treatment consisted in atropine and salines. He refused to take calomel which we thought would be beneficial. From that time until my last visit on May 26, he steadily improved until vision had returned to about the same degree he had enjoyed before this attack. A few days later coma set in, he sank rapidly and died without regaining consciousness.

OPHTHALMIC DIGEST.

BY J. ELLIS JENNINGS, M.D.,
OF ST. LOUIS, MO.

SARCOMA OF THE CHOROID. A SERIES OF CASES. GEORGE F. FISKE, M.D. (*Journal of the American Medical Association*, October 17, 1896).

The author reports five cases of sarcoma of the choroid, of which two died, one certainly and the other probably as a result of a recurrence of the sarcoma in other parts of the body. The practical questions which present themselves are:

1. The question of early diagnosis between the separation of the retina and the separation of the retina which is caused by a tumor behind it.

2. The question as to whether enucleation shall be advised in cases where the diagnosis is not certain.

3. The importance and duty of assisting one another by giving to each patient, in all cases of doubt, *i. e.*, in almost all cases of ablatio retinae, full notes and sketches for use when patients consult other specialists, which is usually the case.

First, as to diagnosis: This is often easy when the tumor can be seen, or where glaucomatous symptoms or inflammations of the ciliary body, have presented themselves, also where the separation follows extreme myopia, or a blow, or injury, or seasickness. Where the separation is slight and occurs in the upper half of the field, the tendency of the sub-retinal fluid to seek the lowest level will often assist the diagnosis, and in some cases drawing off the fluid with a hollow needle and syringe will clear up the doubt even though the separation is not cured by that means.

The importance of early diagnosis is greatly increased by the fact that these choroidal sarcomas almost always occur as primary and not as metastatic sarcomas. I have not found in the literature a single case of sarcoma or melano-sarcoma occurring as a metastasis following sarcoma in some other portion of the body. On the other hand, particularly in the case of melano-sarcoma, metastases in other parts of the body following the sarcoma in the eyeball are very frequent and fatal.

Second, as to indications for an operation in cases of doubt, I would suggest enucleation be advised where: (a) the vision is irrevocably destroyed and there is doubt as to the presence of a tumor; (b) where, though there is slight vision present, it is failing rapidly through extension of the separation, and there is no previous examination by colleagues, excluding the presence of a tumor, with no good reason for excluding it from the history of the case; (c) where glaucomatous symptoms show themselves or cyclitis or irido-cyclitis.

A CONTRIBUTION TO THE QUESTION OF REMOVAL OF THE LENS IN MYOPIA. HERBERT HARLAN, A.M., M.D., Baltimore, Md. (*Journal of the American Medical Association*, November 28, 1896).

Jno. Harvey, aged 32, a Welshman and laborer by occupation, had always been very short-sighted. He carried in his pocket a pair of — 13 D. glasses which he occasionally used for reading. By their help it was not necessary to hold the print so near his face. For distance, he said they were not much good. On January 8, he received a blow in the right eye, which, he said, had always been the better. Some hours later he came to me at the Presbyterian Eye and Ear Hospital. There was a bruise on the right cheek and eyelid and examination showed the lens still perfectly clear, dislocated into the anterior chamber. The upper edge was a little above the centre of the pupil and with the ophthalmoscope the fundus could be easily seen, either through the lens or above it, and by the indirect method, in one position, two images of the optic nerve could readily be seen, at the same time. There was some redness and pain. The left eye had high myopia with choroidal atrophies and very little vision. Removal of the lens was advised and the following day the operation was performed, a downward corneal section being made. There was some loss of vitreous but the healing process was uneventful. The iris was not touched at the time of operation, but at the present time is tucked down behind, as it were, though not adherent to the corneal wound. The appearance is as if there had been a large downward iridectomy done. On February 4, + 3.50 D. S. + 4.50 cyl. 165 gave $\frac{15}{xL}$ vision and 8 D. S. same cyl. enabled him to read No. 1 readily. On looking out of the

office window where a mild storm was in progress he remarked that it was the first time he had ever seen snow falling when on the inside of the house. The glasses indeed would indicate a much less degree of original myopia than — 13 D. the old glasses. Fukala, Pflueger, Von Hippel and others have noted the very high refractive power of the human lens in these cases.

The second is a case of accidental removal of a lens, in a child, with high myopia, resulting in good vision at the age of 45. Fellow eye at that time lost by choroidal atrophy.

Sister M., a cloistered nun, aged 45, stated that she had always used her right eye, but of late, she did not see well with this one and that the left, which had been injured, was now the better, but she could not read at all. I found the right had only a vision equal to the counting of fingers at eighteen inches. With the left V. $\frac{10}{L}$ and was slightly improved by plus lenses up to 2 D. The ophthalmoscope revealed in the right high myopia with extensive choroidal atrophies while in the left there was seen, behind the iris, an irregular opening through what was evidently the remnants of an opaque lens capsule. Further questioning brought out the fact that the injury was caused by a blow from the end of a stick and occurred at the age of 13 years.

It was then plain that there had been, at that time, a traumatic cataract, followed by absorption of the lens substance. There was no fundus trouble in this eye and 5 D. + enabled her to read "brilliant" at twelve inches.

So here was a case of accidental removal of a lens at 13 followed by good vision, $\frac{10}{L}$ without glasses, at 45, in this eye, while in the fellow, in which no attempt at correction by glasses, has ever been made, the myopia had probably increased, the choroid had atrophied and all useful vision had been lost. Would removal of this lens in childhood have saved this eye? The fact of about 2 D. of accommodation in an eye without a lens is of some interest. It is likely that a carefully adjusted glass would improve the given vision in the left eye, but I was obliged to see the patient at the nunnery and to use a candle for the ophthalmoscopic examination. The patient was apparently embarrassed and gave hesitating answers and no attempt was made to correct possible astigmatism.

BOOKS AND PAMPHLETS.

DISEASES OF THE EYE. A Hand-Book of Ophthalmic Practice for Students and Practitioners. By G. E. DE SCHWEINITZ, A.M., M.D. With 256 Illustrations and two Chromo-Lithographic Plates. Second Edition, Thoroughly Revised. Philadelphia: W. B. Saunders. 1896. Price, \$4.00.

That this extremely practical hand-book of the well-known author has found the deserved favor with the public, is shown by the fact, that already a second edition has appeared. This new edition is enlarged by the addition of a number of new subjects, while others have in the revision been treated somewhat more extensively than in the first edition. This book is destined, it seems, to be one of the best known and most useful text-books.

PAMPHLETS.

"On Light," By Myles Standish, M.D.

"An Otological Convenience." By H. A. Alderton, M.D.

"Dr. Kroll's Orthoptic Exercises." By Ch. F. Prentice.

"Remarks on the Causes of Glaucoma." By Leartus Connor, M.D.

"The Treatment of Otorrhœa and Its Importance." By Edward B. Dench, M.D.,

"La Strabométrie et L'Urgence de son Emploi." Par L. de Wecker et J. Masselon.

"Twenty-Seventh Annual Report of the New York Ophthalmic and Aural Institute."

"Excessive Hæmorrhage After Enucleation of the Eyeball." By Robert Sattler, M.D.

"The Field of Monocular Fixation and Its Relation to Heterophoria." By Casey A. Wood, M.D.

"The Diagnostic Importance of Double Optic Neuritis in Focal Lesions of the Nervous System." By Robert Sattler, M.D.

"The Upper-Tone Limit in the Normal and Diseased Ear, as Determined by the Galton Whistle." By H. A. Alderton, M.D.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

FEBRUARY, 1897.

NO. 2.

ORIGINAL ARTICLES.

IS THERE EXTRA-CRYSTALLINE ACCOMMODATION?

BY CHAS. H. BEARD, M.D., CHICAGO, ILL.,

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DONDERS, von Graefe, von Helmholtz, are names that stand for intellects so overwhelming, for scientific investigation so accurate, that the ordinary mortal is trebly handicapped when he presumes to put in question any statement which they have made. Yet the world would not be progressive if one should not seek for error, as well as for truth, and it were wrong blindly to accept as final what a great man says; still worse to accept as truth what a great man frankly states to be only a hypothesis. Some such reasoning as this, it is presumed, actuated Tscherning, for example, when he conceived the theory, and instituted the experiments which led to his series of articles¹ calculated to refute the generally accepted explanation, given by von Helmholtz, relative to the changes occurring in the crystalline lens during accommodation.

Our text-books of ophthalmology positively deny, entirely ignore, or put aside with slight reference, as unworthy of con-

¹Archives de Physiologie, Norm. et Path., 1894-1895.

sideration, the possible existence of any means whereby the vision can be adapted for varying distances except that through the intervention of the crystalline lens, and this, in spite of the fact that most of us are being continually confronted by instances that argue differently, viz.: aphakial eyes, and eyes supposed to have reached the age of total presbyopia, with normal vision for distance, and reading J. No. 1 at 8" with the same lens,—that, too, without looking obliquely; when we see persons with high degrees of hyperopic astigmatism making pressure with the finger and thus correcting their own error of refraction; when we reflect that the usual explanation of the so-called "second sight," that of increased index of refraction, is by no means satisfying, since eyes so endowed are not necessarily myopic. Moreover, the surprise so often expressed by oculists at the power of accommodation remaining after thorough use of atropine. All these, and other things of like nature, do not tend to increase our faith in the proposition that accommodation rests solely with the crystalline lens. Nor is it altogether rational, after putting such cases as just mentioned to severe tests, the results of which all go to disprove the correctness of said proposition, to assume that, after all, certain errors *must* have crept into our observations.

Apropos of the latter, among the few cases published in this country of apparent accommodation in the aphakial eye, was the translation, by Knapp, of an article by Dr. Paul Silex, of Berlin, in the former's *Archives*, Vol VIII, No. 3, 1889. The author first demonstrated that there was really great accommodative power in the eye by eliminating all elements of trickery, even to that of narrowing of the palpebral fissure (which, by the way, is a genuine means of accommodation.) Then he submitted the cornea to an ophthalmometric test, reasoning that, if the accommodation were due to elongation of the globe by external muscle-pressure, the corneal images would show it. Whereupon, although the eyes converged, *the pupil contracted*,² and "the boy alleged" that he could read the test type, the corneal images remained unaltered. That was conclusive to Dr. Silex. That eye was absolutely devoid of adaptability for distances, and he fell back on the proverbial insidiousness of certain inaccuracies.

So long as the near point is approached to the eye, or more

²This phrase was not italicized in the original.

distinct vision is attained, provided this be not accomplished by means of the interposition of a convex lens, or the addition of a convex lens to one already interposed, or by looking obliquely through a converging medium, no matter how else the thing is done, whether by factors working in the eye or others around about it, this is accommodation.

There is too great a disposition on the part of those more or less familiar with the eye to regard that organ in the light of an ordinary optical instrument; neglecting the fact that it is a living, subtle, almost a thinking, thing. It is too far removed from an artificial product, be the device never so cunningly fashioned in imitation, to be accused of a resemblance. Permeating its seemingly mechanical functions there is a hidden, penetrating instinct. In no others of its offices does it act less unlike a machine than in those of accommodation and refraction. Yet, even in these, there can hardly be claimed for it an analogue. In those very features that would tempt comparison with the camera, for instance, the tritest of all the "likenesses," its lids, (cap), its cornea, (first part of lens), its light-proof walls, (box), its crystalline, (second part of lens), its iris (stop), its image-screen, (ground glass), how vastly different!

Taking these parts in their order, and leaving out of count the constantly changing convexities of the lens as not pertinent to the subject, conspicuous among the differences alluded to, and serving, on occasion, much or little to qualify the visual perception, one may cite:

First, the lids. Too much has been said on this subject, and the fact is too commonly acknowledged, that the eyelids act as accommodators, *i. e.*, by partly closing, to cut off diffusion circles, that it needs to be further insisted upon here.

Second, the form and substance of the cornea. It is more refractive towards the periphery than at the centre. Widening or dilatation of the pupil induced by our efforts to see in obscure light is, owing to this peculiarity, accomplished without loss of acute vision, as the outer rays of the enlarged pencil of light get an extra bending and increased circles of diffusion are prevented. It is this quality of the cornea, as has been indicated by Dr. Jackson, of Philadelphia, which sometimes gives inconvenience, in poor light, to those of our hyperopic patients, whose total error we have corrected. For then the conditions are such that the extra bending at the periphery

causes myopia, and the individual is helpless to see distinctly, not even being able to call to his aid the narrowed palpebral fissure, which would too greatly reduce the illumination. Then, too, the cornea is a compressible meniscus, wherefore, as unquestionably happens, at times, in low degrees of astigmatism, more distinct vision is gained by "nipping" of the lids. Thus does the cornea become a factor in accommodation.

Third, the walls of the eyes are yielding and elastic, and are closely embraced by at least seven strong muscles, the four recti, the two obliques, and the orbicularis, whose contractions and relaxations have known, and, doubtless unknown, influences to modify the curves and dimensions of the globe. Among the known are those of the orbicularis, and among the unknown those of the other six.³ It has been denied,—by Panas for one,—that the obliques, acting in unison could compress the globe, as their action would be to cause only divergence instead. It must be remembered, however, that their strain, pulling from points well forward, would have but comparatively slight leverage to rotate the eye outward, the antero-posterior axis being already relatively convergent, and the tension of three powerful recti muscles operating to keep it so. It is possible, also, that contraction of the ciliary muscle may produce constriction of the globe in its particular zone, thereby affecting an appreciable recession of the posterior pole of the eye. Especially might this occur in the eyes of the young, precisely the class of subjects in which a collateral accommodation, that form associated with aphakia, at least, has been most often observed. Considered in the light of the knowledge that the moving backward of the retina of only .28 mm. in hyperopia, .31 mm. in emetropia, and .38 mm. in myopia is equivalent to the shortening of the focus by one dioptric such accommodation appears neither wonderful nor absurd. Demonstrations to the contrary, by means of the ophthalmometer, taking cognizance, as they do, merely of decided alterations in the corneal images, might be misleading. One could conceive a certain lengthening out as being limited

³Février, *Annales d' Oculist.*, February, 1892, thought to have demonstrated that the obliques have the power to lengthen the antero-posterior axis. The same author has also shown how pressure of the orbicularis, in cases of myopia, may shorten this axis.

to the posterior, thinner, half of the globe, though the squeezing force were brought to bear nearer the anterior portion, in which event a change in the cornea might not be apparent. There are those who, in using the ophthalmometer, claim to have seen the changes occur in the corneal images consequent upon efforts of accommodation.

As to the crystalline,—the fourth part of our camera (sic),—it concerns us but little in this connection. Suffice it to say that it is a most extraordinary lens, passing from phase to phase in its nature, keeping in touch, as it were, with the requirements of its possessor's age; complex beyond present perception in form, substance, and working. The papers of Tscherning, just referred to, and the curious powers of discrimination, in matters of the transmission of light and heat, ascribed to it by some recent writers, are but fresh evidences of its unknownness; and it would not be surprising to hear of its having accommodative properties even in repose.

Fifth, the iris. While, to all outward semblance, this member of the photographic outfit holds a station most nearly fulfilling the conditions of a purely mechanical appliance, it would seem to be *that* one of whose telling performances the average oculist takes least note, and by which he sets least store. The humblest manipulator of the poorest hand-camera, even the lowly being who aspires only to "press the button," recognizes the tremendous value of his "stops." Hardly a tyro among the amateurs who, if he is the lucky owner of a lens whose focal distance is 15 centimetres, suppose, but will tell you that, with about the largest stop, (say $\frac{1}{8}$) the nearest point at, and beyond which, it will focus all objects is 22.5 meters. Whereas that, with about the smallest opening (say $\frac{1}{256}$) this point approaches to within 44 centimetres, and that, with a "pin-hole" aperture, the focus is practically infinite. The iris, with its infinitely varying pupillary area, does all that the photographic diaphragm does and more. Yet how many authors are there in matters of the eye, who tell, although, mayhap, they are well aware of it, to what extent the rôle of accommodation is played by this perforate membrane?

Sixth in sequence, comes the receptive screen where the image is made. Here, in lieu of a simple, fixed surface, *whereon* is mirrored a "counterfeit presentment" in length and breadth alone, is a profound and amazing labyrinth, *wherein* the assem-

bling rays are caught, and resolved into the impulses which give us sight. The picture here is indeed unique, and inimitable—it has the third dimension—and one-half a millimetre, or less, in such a creation, is deep—for in it there is hurrying movement, strange chemical energy, curious analysis, and abstruse discernment—in short, the true life. Who shall say that the gathering of light there must conform to the identical conditions and limitations which are requisite for an ordinary image? Small wonder if there be not accommodation in the retina itself!

The bibliography of the accommodation of the eye other than such as relates to that effected through the great factor, the crystalline lens, for and against combined, is surprisingly scant. There seems to have been a tacit agreement among ophthalmologists that Thomas Young and von Helmholtz had left but little unsaid: and, relatively speaking, such is really the case. The great majority of those who have written concerning extra-crystalline accommodation have been, naturally, of the German nationality; as, for instance, Graefe,⁴ Förster,⁵ Schlösser,⁶ Schneller,⁷ Sattler.⁸ As having a direct bearing on the subject might be added papers by Février,⁹ in France. These are about all.

In concluding, I wish to make brief mention of two cases, lately examined by me, which illustrate phases that have some relevance to points herein touched upon, which, in fact, constitute my apology for writing this article.

Miss T., aged 63 years. Perfectly healthy eyes.

R. V. = $\frac{20}{L}$; $\frac{20}{xx}$ w. + 2 D. s. $\bigcirc$ + 1 D. cyl. ax. 180° .

L. V. = $\frac{20}{L}$; $\frac{20}{xx}$ w. + 2 D. s. $\bigcirc$ + 0.75 D. cyl. ax. 180° .

With the same glasses, and looking straight, with eyes well open, reads J. No. 1 at 8".

⁴Graefe.—Saemisch. Handb. Vol. v., p. 144.

⁵Förster.—Zehender's Klin. Monat., 1872.

⁶Schlösser.—Sitzungsb. f. Morph. u. Phys., München (92) '93, viii, p. 131-134.

⁷Schneller.—Graefe's Archiv., Vol. xxxii.

⁸Sattler.—Graefe's Archiv., Vol. xl.

⁹Février.—Annales d' Oculist., February, '92, February, '93, and September, '94.

Purkinje's images fail to show any change during accommodation. The pupils are quite active.

Andrew H., aged 12 years; originally double lamellar cataract. Both lenses removed through discussions by Dr. Montgomery, of this city, at the Illinois Charitable Eye and Ear Infirmary, over a year ago. Clear, round, movable pupils.

R. V. = $1.5/_{cc}$; $30/_{o}$ + w. + 20 D. Not improved by cyl.

L. V. = $3/_{cc}$; $30/_{LXX}$ + w. + 20 D. Not improved by cyl.

With the same glasses, looking straight through them, with eyes well open, *reads J. No. 1 at 5''*. The pupils contract very considerably in accommodation. Did not test with the ophthalmometer.

IS THERE A LAYER OF PIGMENT EPITHELIUM CELLS BETWEEN THE CHOROID AND RETINA?

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[With Micro-Photographs.]

IN Volume XXIV, No. 3 of *Knapp's Archives*, G. Lindsay Johnson, of London, has published the first of a series of articles entitled, 'Observations on the Macula Lutea.' These excellent articles are illustrated with most beautiful photographs.

Among the results of his observations there are, however, a number which are so startlingly at variance with what has thus far been generally considered to be correct, that they necessarily arouse a renewed study in this most interesting field.

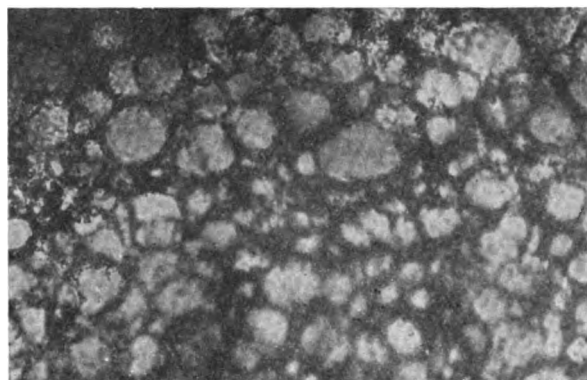
In his observations on the hexagonal pigment layer he states: "As to the hexagonal pigment layer itself, it is permeated to such an extent with pigment, that it is excessively difficult to distinguish its structure clearly unless very thin sections be made.

"It seems to me that what have until now been taken for the nuclei of hexagonal cells are independent spherical corpuscles (spherules)."

And further on: "The fact that in some cases these

spherules are entirely detached and float free in the field of the microscope, the fact that *I never have seen hexagonal cells isolated* or even partially detached from each other along the line of the septa, and lastly the fact that spaces can frequently be seen around these spherules when *in situ*, all point to their not being nuclei."

In recapitulating he goes on to say: "The membrana vitrea is the limit of the choroid, then follows a space, then the membrana terminans retinæ, then a *gelatinous layer in which spherules lie surrounded by embedded spherical pigment granules*; lastly the acicular pigment crystals lying in irregular clusters in a plexus. This plexus is a direct continuation of the bacillary layer," etc.



• FIG. 1.

One of the points concerning which I think we must differ with this description, is the one relative to the existence or non-existence of a hexagonal pigment cell layer consisting of distinct and separate cellular elements.

In spite of the scholarly investigations of Johnson, it seems to me that such a layer of cells does undoubtedly exist and that his spherules are after all the nuclei of these cells.

The regularly outlined and sharply defined hexagonal pigment-cells as they are usually drawn in the text-books, it is true, are but rarely seen and (see Figs. 1 and 2) the two photographs here given, taken at random from a large number of specimens show what is most frequently seen, when the cho-

roid, with the pigment layer undisturbed, is put under the microscope.

We see then an irregular dark network consisting of pigment granules and spiculæ, varying considerably in density and depth of color, which surrounds numerous light spaces of a round or oblong shape. As these light spaces are separated by pigment bands which vary extensively as to their thickness, this membrane presents a very peculiar aspect. Sometimes we find only an almost uniformly dense layer of pigment granules pierced, so to speak, like a sieve by light spaces more or less equidistant from each other. In other cases again, the light spaces are considerably larger and barely separated from each other by slender lines of pigment granules.

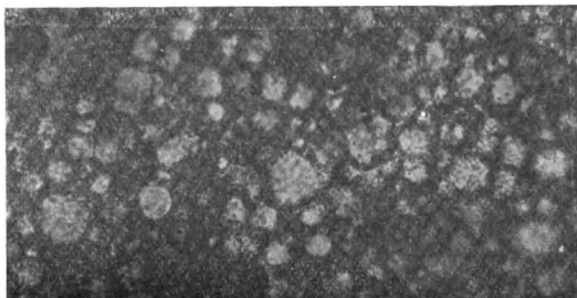


FIG. 2.

It is usually accepted that these light spaces are produced by the presence of the unpigmented nucleus in the cells.

In Fig. 3 I have photographed a different picture. Here the pigment is seen to be also very irregularly distributed and the light spaces are much less pronounced than in Figs. 1 and 2. On the other hand, however, there can, I think, be no doubt as to the fact, that this membrane consists of cell bodies of distinct individuality. It, furthermore, shows that there is a cementing substance between these cells and that the cells may become *separated in the line of the septa*. The shape and size of the cells in this particular specimen varies greatly. Some cells are double and more the size of others and while some have only five angles, others have seven and even eight. The majority are, however, hexagonal.

It is to be noted, that these pictures show the aspect of the inner surface of the pigment epithelium layer from which the retina had become detached during the hardening process, without aid, and that they are not sections.

In explanation of these varying pictures and the comparative rarity of specimens which show, without any interference, the exact shapes of the cells and leave no doubt as to our really having to deal with cells, we must assume that such pictures are due to the physiological migration of the pigment into the interstices between the outer segments of the rods and cones. Naturally, different periods in this process must give different pictures. I suppose, that we have only a chance to see the regular shape and size of the cells plainly when they are physiologically at rest.

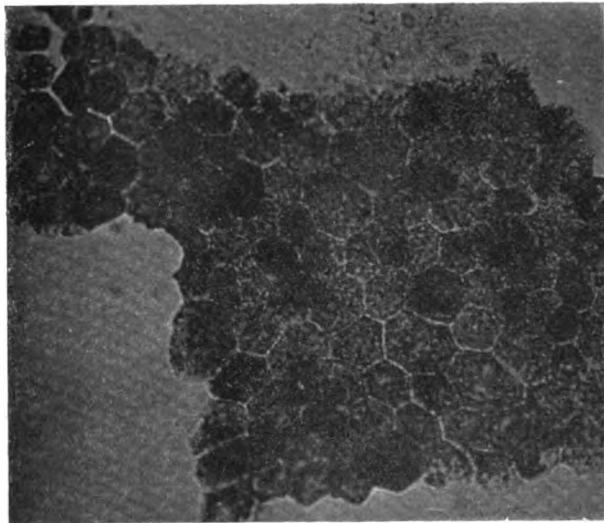


FIG. 3.

To make certain that the pigment layer is composed of individual cells with nuclei is not very feasible by simply scraping the pigment layer off the choroid. Such a procedure generally breaks up the cells and is useless.

An undoubtedly convincing proof of the fact that there is a separate pigment epithelium layer, consisting of cells of a more or less regular hexagonal shape, with a nucleus belong-

ing to each cell, is most easily obtained by bleaching the pigment.

When the bleaching has been successfully accomplished, we see in transverse sections a continuous row of separate and distinct low cells, each one with a nucleus lying sometimes closer to the retinal, sometimes to the choroidal surface of the cell.

When viewing the whole layer from its retinal surface, we again see that it consists of individual cell-bodies more or less hexagonal, each with a nucleus which very frequently (almost always) does not lie in the centre of the cell but in or near one of its corners. These cells are divided from each other by some cementing substance. (See Fig. 4).

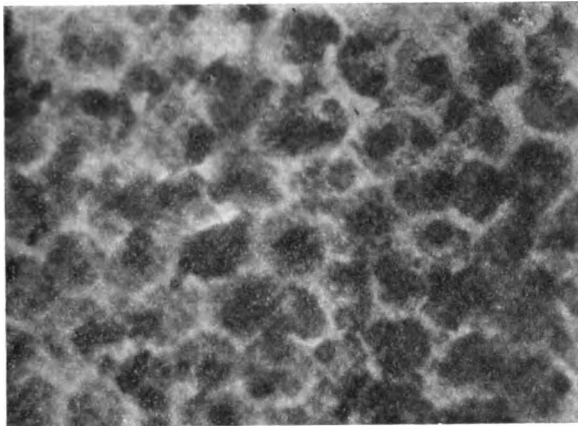


FIG. 4.

Under such circumstances it is not difficult to isolate the cells, as the bleaching process probably destroys the cementing substance between them.

Figure 5 shows a group of such isolated bleached and stained pigment epithelium cells scraped from the choroid with great care, as the cells break to pieces very easily. One cell lies on its edge and shows how they appear in transverse sections.

If this is not convincing enough, Figure 6 will, I think, convince the most sceptical observer. It shows an isolated,

octagonal bleached cell magnified about 1200 times¹ which has two nuclei. I may state that I have also seen now and then a cell with three nuclei.

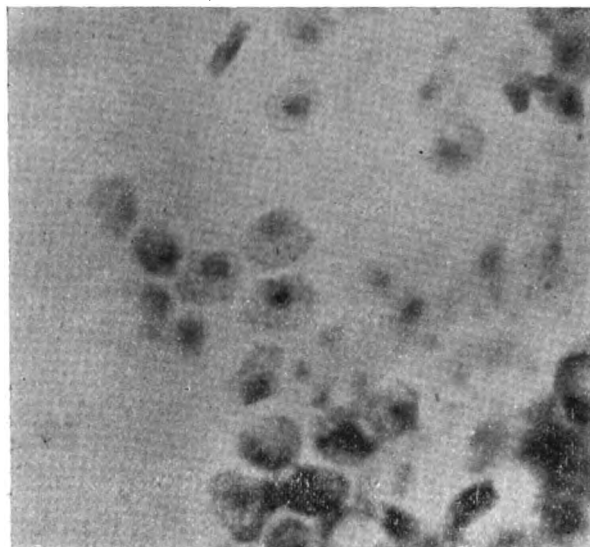


FIG. 5.

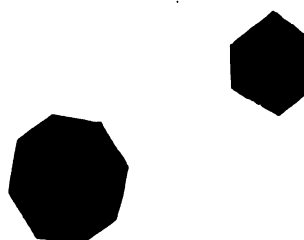


FIG. 6.

From the foregoing, I think, concerning the point here considered, we have good reason to adhere to the older views and to maintain the existence between choroid and retina, of

¹On account of the high magnifying power the outlines of these cells were not very sharp. I therefore painted the background white which accounts for the unnaturally sharp outlines.

a pigment epithelium layer which consists of individual cells of an almost regularly hexagonal shape and each with a nucleus. Whether these nuclei are called nuclei or spherules does, of course, not matter as long as we know that they are the integral parts of these cell-bodies and do not lie in an undivided general gelatinous layer as separate organs.

I have in this article refrained from bringing forward any support afforded to my standpoint by the pathological changes peculiar to this layer which, I may add, seem to me to offer still greater and more powerful evidence against Johnson's opinion.

A NEW OPHTHALMIC RECORD BOOK.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO.

THERE are many ophthalmic record books on the market all of which, save one, are lacking in some particular. Ophthalmologists desire to get a large amount of data in as small a space as possible. Likewise they are too busy to keep several sets of books. Many record books require one to keep in addition a cash book. At my suggestion, Geo. L. Goodman & Co. (No. 9 Cliff Street), New York City, have made several changes and additions to their excellent ophthalmic record, so that they now have the best record of this kind on the market. It combines a case record with credit and debit sheet. One excellent feature is the urine record they have added at my suggestion. It is of the greatest importance that ophthalmologists should make a careful urinalysis in all cases of neuritis, retinitis, iritis, etc. In addition to this it has a table for three weeks' record of daily exercise of ocular muscles. Also record for esophoria, exophoria, etc.; tests with and without mydriatic on test-types; perimetric chart; chart of fundi and space for ophthalmoscopic report; chart for recording axes in retinoscopic test; frame measurements; age and addresses, etc.; general history and family history.

The book contains 600 pages (record for 300 cases) and each page is 10 x 13 inches.

CLINICAL MEMORANDA.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

TWO CASES OF ATROPHY OF THE OPTIC NERVES AFTER TYPHUS ABDOMINALIS, ONE DUE TO A DEBILITATED CONDITION, THE OTHER TO MENINGITIS.

PATIENT, W. C., aged 19 years; had typhus abdominalis twice, first a year and again three months before consulting me about his eyesight. His physician brought him and from his statement there is little doubt as to a correct diagnosis and observation. After the second attack of typhus had spent its force, the patient noticed a gradual failure of sight in the left eye and for a week or two he noticed that the right eye was not as good as formerly.

I found V., R. E., to be $\frac{20}{XL}$?; L. E., $\frac{20}{LXX}$?. The visual fields were concentrically reduced, especially the left one. Color perception was good. The ophthalmoscopic picture was that of atrophy of the optic nerves, the retinal vessels were, however, not very thin.

As I had expected, the condition rapidly improved under treatment, consisting of strychnine injections and nitroglycerine given internally. After two weeks' treatment he was discharged with V., R. E., $\frac{20}{XX} +$ and L. E., $\frac{20}{XXX}$. The ophthalmoscopic picture was much the same as when I first saw him.

Miss. M. F., aged 39 years, came to consult me about her sight which was lost altogether four months previously during a very severe attack of typhus abdominalis. Although there had been a gradual improvement, she can not dare to walk unguided, and can not read or sew for any length of time.

I found her vision to be about $\frac{20}{L}$ in either eye.

Ophthalmoscopic examination showed the symptoms of

neuritic atrophy of the optic nerves. The right papilla was of a chalky whiteness, no small bloodvessels were visible, bare microscopic threads indicated the larger ones. The papilla, furthermore, was slightly excavated. Its nasal outline was indistinct, dirty gray and near it innumerable minute yellowish patches slightly pigmented were seen in the retina evidently occupying the outer layers of this membrane.

The left papilla was grayish-white, also slightly excavated, its outlines not distinct. The retinal bloodvessels were a little better visible than in the right eye. There were no pigmented spots in this retina.

Her visual fields were reduced to the point of fixation. Color perception bad.

Upon inquiry, her physician, Dr. G. Taphorn, of Alton, Ill., wrote me that her attack of typhus was accompanied by marked cerebral inflammation for about ten days. When the fever disappeared it was found that she was totally blind.

She is still under the treatment of injections of strychnine and internally nitro-glycerine, yet, though slowly, she is gaining especially in her left eye. She has to-day $\frac{20}{xx}$ vision in either eye; but the right field is unchanged, while the left one is enlarged to about 10° on the temporal side. She reads Sn. 1 with + 1.25 D. easily, her chief trouble being the smallness of the fields and the consequent necessity of moving her head continually.

A CASE OF SYNCHISIS SCINTILLANS WITH NORMAL VISUAL ACUITY.

PATIENT, Mrs. A. M., aged 51 years, called on me simply for stronger reading glasses. She was not conscious of anything being wrong with her eyes. While she sat before me in good light, I thought I saw some glittering body behind the lens fitting through the pupillary area of the right eye as she moved her eyes. V. = $\frac{20}{xx}$ in either eye.

As I had examined her eyes carefully only three years previously and had not seen anything unusual in her eye at that time, I was greatly astonished to see now on ophthalmo-

scopic examination a beautiful sample of synchysis scintillans concerning only one, the right eye. Smaller and larger white, grayish-white and silvery crystals seemed to be dispersed throughout the vitreous body, bobbing up and down, and being thrown in a whirl, according to the movements of the eye.

The vitreous body showed no fibrillar tissue, the retina and choroid, so far as I could see, showed no pathological signs (the pupil was not dilated), but, what is rather astonishing, the lady was not even aware of anything peculiar in this eye. The eye was moderately hypermetropic and presbyopic. There had been no preceding affection, nor was there a known diathesis.

LACK OF ORBITAL FAT, CONGENITAL MICROPH- THALMUS, PERSISTENT PUPILLARY MEM- BRANE AND FŒTAL TISSUE IN THE VITREOUS BODY.

PATIENT, Cl. B., aged 5 years, was brought to me on September 18. His eyes were very small and very deeply seated; the orbital fat being evidently undeveloped. Considerable nystagmus. V., R. = $\frac{1}{\infty}$; L. = $\frac{1}{\infty}$ excentrically; no central vision. With oblique illumination remnants of the fœtal pupillary membrane are found situated in the inner lower quadrant. The threads starting from the iris surface converge rapidly toward a broad apex which is attached to the anterior lens capsule near the anterior pole. Behind the lens a misty cloud could be seen moving in the vitreous body. After the pupils had been dilated, I found in either eye a silverish gray substance, starting from where the papilla would normally lie. This substance seems to grow in breadth as it projects into the vitreous body. It leaves but a small peripheral portion of the retina visible, although not all around. The tissue is translucent enough to permit of a dim vision of several larger bloodvessels and the whole moves rapidly with each motion of the eyes.

SOCIETY MEETINGS.

PRELIMINARY PROGRAMME OF THE WESTERN OPHTHALMOLOGICAL, OTOLOGICAL, LARYN- GOLOGICAL AND RHINOLOGICAL ASSOCIATION.

SECOND ANNUAL MEETING, ST. LOUIS, MO., APRIL, 8-9, 1897.

PLACE OF MEETING, "PLANTERS HOTEL."

PRESIDENT,	- - - - -	ADOLF ALT.
VICE-PRESIDENTS,	- - -	} F. E. FRYER.
		} J. H. MARTINDALE.
TREASURER,	- - - - -	W. L. DAYTON.
SECRETARY,	- - - - -	HAL FOSTER.

THURSDAY, APRIL 8.—SESSION AT 9 O'CLOCK.

Address of Welcome, by Dr. W. J. Langan, President St. Louis Medical Society. Response, by D. A. C. Corr, President Illinois State Medical Society. President's Address, by Dr. Adolf Alt, St. Louis, Mo. Reception of guests. Registering and payment of dues. Report of the Secretary and Treasurer. Election of members.

A cordial invitation is extended to the profession. The railroads promised a one and one-third fare for round trip. When buying tickets ask for a certificate, on reaching St. Louis have it signed by Dr. Alt.

PRESENTATION OF PAPERS.

1. Hæmorrhagic Glaucoma, Illustrated by Microscopic Lantern Slides, Dr. Adolf Alt, St. Louis. 2. Report of Six Cases of Removal of Ossicles, Dr. Norval H. Pierce, Chicago, Ill. 3. A Pyramidal and Senile Cataract in One Subject, Report of a Case, Dr. Geo. F. Suker, Toledo, Ohio. 4. A case of Oculo-Motor Paralysis, Dr. Geo. E. Bellows, Kansas City, Mo. 5. Adenoid Vegetations, Dr. Ellet Orrin Sisson, Keokuk, Ia. 6. Some Observations Upon the Irritating Effects of Natural Gas Upon Trachoma, Dr. John John Kyle, Marion, Ind. 7. Treatment of Chronic Suppuration of the Middle Ear, Dr. S. S. Bishop, Chicago. 8. Astigmatism, Dr. Dudley S. Reynolds, Louisville, Ky. 9. Diseases of the Glosso-Epiglottic Space, Dr. J. F. Barnhill, Indianapolis, Ind. 10. The Classification of the Exudative Anginæ, Dr.

- E. B. LaFevre, Abilene, Kans. 11. Skin-Grafting for Malignancy of the Orbit and Entropion, Dr. Flavel B. Tiffany, Kansas City, Mo. 12. Restoration of the Eyelids by Skin-Grafting, Dr. W. C. Tyree, Kansas City, Mo. 13. An Improved Skiascope, Dr. J. Ellis Jennings, St. Louis. 14. Scopolamine as a Mydriatic and Cyclopegic, Dr. Wm. S. Fowler, Chicago. 15. Optic Neuritis, Dr. C. F. Evans, Louisville, Ky. 16. Report of a Case of Congenital Membranous Cataract with Aphakia, Dr. A. S. Magee, Topeka, Kans. 17. Moderate Errors of Refraction; Shall We Always Correct Them? Dr. Albert E. Bulson, Ft. Wayne, Ind. 18. Conservatism in Rhinological Practice, Dr. B. M. Berens, Minneapolis, Minn. 19. Mental Depression and Prolonged Melancholia following Graduated Tenotomy and the Limitation of Prisms, Dr. W. H. Becker, Lynchburgh, Va. 20. Report of a Case of Double Mastoid Disease; Operation; Recovery, Dr. J. O. Stillson, Indianapolis, Ind. 21. The Technique of Cataract Extraction, Dr. B. C. Fryer, Kansas City, Mo. 22. Diseases of the Labyrinth, Dr. J. Hollinger, Chicago. 23. Keratoconus, Dr. J. W. Bullard, Pawnee, Neb. 24. A Case of Acute Angle-Closure Glaucoma of Reflex Nasal Origin, Dr. J. Alcyous Mullen, Houston, Tex. 25. Syphilitic Amblyopia, Dr. Robert F. Lemond, Denver, Colorado. 26. Congenital Nystagmus, Dr. J. Elliott Coleman, Chicago. 27. Objective Noises in the Ear, Dr. G. Sterling Ryerson, Toronto, Can. 28. Function of the Stapedius and Tensor Tympani Muscles, Dr. Thos. F. Rumbold, St. Louis. 29. Saline Injections in the Treatment of Cyclitis and Iritis, Dr. S. L. Ledbetter, Birmingham, Ala. 30. Paper, Dr. W. E. Gamble, Chicago. 31. College Instruction in Ophthalmology, Dr. A. M. Lapsley, Keokuk, Iowa. 32. The Value of Hypnotic Suggestion in Ophthalmic Practice, Dr. Ignatz Mayer, Guthrie, O. Ty. 33. Description of Dr. McCassy's Trial Frame, Lachrymal Style and Threaded Handle, Dr. J. H. McCassy, Dayton, Ohio. 34. The Lens Tester and Why Used, Dr. J. H. Johnson, Kansas City, Mo. 35. The Etiology, Treatment and Prognosis in Exophthalmic Goitre, Dr. F. C. Clark, Fairfield Iowa. 36. Extraction of Bilateral Soft Cataract in the Case of a Child Three Years of Age, Dr. J. O. McReynolds, Dallas, Texas.

CATALOGUED
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FRIDAY, APRIL 9.

Election of Members.

Election of Officers.

PAPERS.

1. Two Cases of Asthma, Due to Intra-Nasal Growths, Dr. W. W. Bulette, Pueblo, Colo. 2. Aural Pain, Dr. A. M. Howe, Wichita, Kans. 3. Influence of Vaporized Medicaments on the Respiratory Passages, Dr. Homar M. Thomas, Chicago. 4. Hysteria in Ophthalmology, Dr. W. L. Dayton, Lincoln, Neb. 5. Otitis Media Circumscripta, Dr. C. M. Holcomb, Winfield, Kans. 6. Ulcer of the Cornea, Dr. H. Z. Gill, Pittsburgh, Kans. 7. Paper, Dr. J. D. C. Hoit, Elmwood, Ill. 8. Paper, Dr. Frank Allport, Minneapolis, Minn. 9. Hypertrophic Rhinitis, Dr. W. T. Grove, Eureka, Kans. 10. The Relative Value of Enucleation and Evisceration, Dr. A. R. Amos, Des Moines, Iowa. 11. Paper, Dr. C. W. Kollock, Charleston, S. C. 12. A Plea for More Mild Treatment of the Conjunctiva, Dr. E. W. Ames, Canton, Ill. 13. Paper, Dr. Geo. Knapp, Vincennes, Ind. 14. Thrombosis of the Lateral Sinus, Dr. B.

F. Church, Dallas, Texas. 15. Notes on Nasal Surgery, Dr. A. E. Prince, Springfield, Illinois. 16. Paper, by Dr. K. K. Wheelock, Fort Wayne, Indiana. 17. Paper, by Dr. Chas. H. Beard, Chicago, Illinois. 18. Treatment of Corneal Lesions by Hydraulic Euretting with Sublimate Solutions, Dr. C. H. Pleasants, Helena, Mont. 19. Paper and Demonstrations: Advanced Methods in Teaching the Deaf, Dr. M. A. Goldstein, St. Louis. Discussion opened by Prof. S. T. Walker, Jacksonville, Ill. 20. Three Cases of Suppuration of the Frontal Sinuses Treated by Means of the Air Douche, Dr. P. F. Gildea, Colorado Springs, Colo. 21. Toleration of the Eye to Severe Injuries, Dr. H. G. Sherman, Cleveland, Ohio. 22. A Case of Mastoiditis Complicating Purulent Otitis Media Cured by Enlarging the Drum Perforation and Syringing the Tympanic Cavity, Dr. Wm. Sheppegrell, New Orleans, La. 23. The Relationship of Obscure Throat Symptoms in Adults to the Pharyngeal Tonsil, Dr. H. Moulton, Ft. Smith, Ark. 24. Suppurative Inflammation of the Frontal Sinuses, Dr. Frank E. Sampson, Creston, Iowa. 25. Experiments on the Eustachian Tubes by Means of the Tongue Thrust Into the Naso-Pharynx, Dr. Hamilton Stillson, Seattle, Wash. 26. Atrophic Rhinitis, Dr. I. Oullen, Cincinnati, Ohio. 27. Artificial Membrana Tympani, Dr. E. W. Heltman, Toledo, Ohio. 28. Otitis Media, Dr. E. E. Singleton, Marshalltown, Iowa. 29. Paper, Dr. F. E. Waxham, Denver, Colo. 30. Throat Manifestation of Transmitted Syphilis, Dr. H. W. Whitaker, Columbus, Ohio. 31. Relative Value of the Various Treatments for Deafness Due to Otitis Media, Dr. J. F. Oaks, Chicago. 32. Eustachian Catarrh, Dr. M. Jaw Brown, Salina, Kans. 33. Nitrate of Silver, Dr. Chas. E. Walker, Denver, Colo. 34. Paper, Dr. J. H. Martindale, Minneapolis, Minn. 35. Paper, Dr. F. C. Heath, Indianapolis, Ind. 36. Paper, Dr. Francis Kellogg, Tacoma, Wash. 37. Paper, Dr. Allen T. Haight, Chicago. 38. Lymphadenom With Report of Cases, Dr. C. W. Parker, St. Louis. 39. Paper, Dr. D. Emmett Welch, Grand Rapids, Mich.

DR. GEORGE T. STEVENS has declined to continue the direction of the English edition of the *Annales d' Oculistique* which appeared monthly from January, 1895, until July, 1895, inclusive. Under Dr. Steven's able management this well-known French journal was made accessible to English readers who will all regret that the project to make an International journal had to be given up.

THE ANNALS OF OPHTHALMOLOGY AND OTOTOLOGY for 1897 will be issued in two portions, the *Annals of Ophthalmology* as usual in January, April, July and October, and the *Annals of Otology* (including Rhinology and Laryngology), during the succeeding months of February, May, August and November. The January number under the new order is at hand and contains 212 pages devoted entirely to the eye.

OPHTHALMIC DIGEST.

By J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

DERMOID TUMORS OF THE CORNEA. A. R. BAKER, M.D. (*Journal of the American Medical Association*, October, 17, 1896).

The author reports two cases of dermoid tumor of the cornea, and refers to the fact that Milvalsky (Prague) has reviewed the literature on the subject very carefully and has found recorded seventy-five cases of dermoid tumors of the eyeball. Seven of these he calls atypical, being connected with the eyelids. Five of the cases were entirely corneal, and twelve were situated on the sclerotic and fifty-one were placed partly on the sclerotic.

"The relation of these tumors to the conjunctiva varied. In some the conjunctiva seemed to be replaced by the tumor tissue; in others it covered the surface of the latter, while in most instances a portion of the growth was apparently covered by conjunctiva, while the remainder exhibited on the surface a pavement epithelium, papilla, hair follicles and fine hair. The cystic form or closed dermoid is never met with in the eye."

A review of the preceding cases seem to show that they are all congenital; a few may be located on the cornea alone, a few on the sclerotic but the largest number involved both structures and are found most frequently at the outer and lower sclero-corneal margin.

Van Dusyse's ingenious theory as to the origin of these tumors is not generally accepted, namely, that the amnion was at one time united and through constriction and separation, there remained at the original point of contact amniotic cells from which later the dermoid cysts developed. A more reasonable explanation of dermoid growths in other parts of the body, *i. e.*, an inversion of the epiblast during embryonic ex-

istence, and islet deposit of cells, which makes skin, sebaceous glands and hair follicle.

Little need be said as to treatment. Removal for cosmetic purposes is usually desirable. It does not seem to me that cauterizing the wound as recommended by most writers is necessary, and may only add to the amount of opacity present upon recovery. The same objection is true with regard to the advisability of covering the surface of cornea exposed with conjunctiva, recommended by some writers.

CORNEAL MEASUREMENTS AFTER THE EXTRAC-
TION OF CATARACT. ADOLPH O. PFINGST, M.D.,
Louisville, Ky. (*Archives of Ophthalmology*, July, 1896).

In selecting glasses for the aphakial eye, after the extraction of cataract, it is not an easy matter to decide just how much of the corneal astigmatism, which is always present in a higher or lower degree, should be neutralized with glasses. As the cornea gradually resumes its original or almost original shape by the contraction of the cicatrix, the cylinder glass frequently ceases to be of benefit. To avoid the expense of a new glass after this contraction has taken place, we are often called upon to prescribe at once the lens which we consider best for ultimate use. From an examination of 59 cases the author recapitulates as follows:

1. That two weeks after the flap extraction of cataract, there is corneal astigmatism varying from 1.75 D. with rule to 22.0 D. against rule.
2. That the greatest amount of this astigmatism disappears in the following four to six weeks.
3. That it is slowly reduced for six months, after which it seems there are no further changes.

Bearing these facts in mind it is evident that an accurate estimation of the ultimate glasses can not be made at the end of two weeks. It is, I think, the rule among ophthalmologists to give a temporary glass for three to four months, and allow cicatricial contraction to take place before deciding on the final glass. But even in selecting this temporary glass, being governed by our table, we may select it so as to do for permanent use. In cases with less than 5.0 D. of astigmatism, which

in four months is generally reduced to 1 or 2. D. we have usually prescribed the spherical lens which gave the best vision even though the addition of a cylinder lens was of benefit at the time. In cases with more than 5. D. and especially in those in which the wound had healed with complications, we add 2. D. cyl. with axis indicated by the ophthalmometer and the test glasses, provided the vision was improved.

A CASE OF TOTAL BLINDNESS; POSSIBLY DUE
TO AN OVERDOSE OF QUININE. H. BERT ELLIS
B.A., M.D. (*Journal of the American Medical Association*,
November 7, 1896).

August 8, 1895, I was called to J. W., a man 34 years old. After repeated questioning of the patient and his sister, the following disconnected, incomplete and probably somewhat inaccurated history was elicited:

The young man was an accountant in the employ of one of the Texas railroads and had been with them for years, although for some time he had been an opium, whiskey and tobacco habitué. The first habit he had contracted as a result of the use of opium during an attack of dysentery. Four years ago, he had gone to an institute and had been cured of these habits, but quickly lapsed into them again, excepting that he never renewed the use of tobacco.

I was unable to find out definitely the amount of morphine and whiskey that he used daily. His own statement was to the effect that he had been taking about seven grains of morphine daily. This statement was probably inaccurate, for judging from the amount it was necessary to give to keep him reasonably quiet, at the time I was called, he certainly could not have been taking less than from 10 to 20 grains in the 24 hours, and probably more for some months; and of whiskey he used from one pint to one quart daily.

In October 1894, when suffering from malaria, he had been given by a physician 120 grains of quinine in 24 hours in four doses. In a very short time he was totally blind in both eyes, but this condition lasted only about two weeks, after which there was a gradual return of vision, so that he resumed work on his books, and was able to continue at intervals by

the aid of an assistant (for his vision never became good), till February, 1895, since which time he had not been able to see anything, except to distinguish a bright light occasionally. There was no history of concurrent deafness.

During June and July he had been living with a woman who was an opium habitué and she had kept him constantly saturated with morphine till his sister brought him to Los Angeles.

The patient, 5 feet, 9 or 10 inches tall, was extremely emaciated, weighing about 103 pounds; his normal weight had been from 145 to 150. He had the marked opium cachexia and puffiness of lower lids. There was almost complete loss of the cutaneous and deep reflexes, the knee jerk being entirely absent. The bowels were sluggish, and the urine very scanty, 10 to 12 ounces in 24 hours. He was practically demented, his memory so defective that he could not sustain a conversation.

The pupils were so small that it was quite impossible, in his helpless condition, to make a satisfactory ophthalmoscopic examination, without producing mydriasis, which I did with a weak solution of sulphate of atropin, and found the fundi presenting very small deviations from the normal. Both nerves were pallid and the arteries and veins, though relatively normal, were both slightly reduced in size, no other changes could be detected.

The morphine was gradually diminished and codeine substituted, the whiskey slowly reduced, so that by November 1, he was taking no morphine or whiskey.

At different times, trional in 15-grain doses, chloralamide 30 grains, chloral and bromides 20 and 30 grains, and hyoscyamine $\frac{1}{30}$ grain, were given to quiet him. Sulphate of strychnine was administered, in gradually increased doses, from $\frac{1}{60}$ to $\frac{1}{3}$ grain three times daily, hypodermically, in the temples. The knee jerk and other reflexes returned. Occasionally he would describe quite accurately some object in the room, but these returns of vision were very transient. His intellect improved materially, as did also his physical condition. About November 1, he had two quite marked convulsions, and we decreased the strychnine. The patient died in December, of bronchitis and œdema of the lungs; a condition not unlike senile bronchitis.

Was this a case of toxic amblyopia? and if so, was it due to quinine, morphine, or whiskey?

A CASE OF CHRONIC GLAUCOMA WITH SOME UNUSUAL FEATURES. ROBERT L. RANDOLPH, M.D.
(*Annals of Ophthalmology and Otology*, October, 1896).

T. W. S., healthy man 61 years of age. Four years ago he consulted me about his right eye. I found the cornea the seat of a haze which was so dense as to render quite indistinct the outlines of the pupil. He told me that this haze made its appearance every day, usually an hour after breakfast, and in two hours this cloud had become so dense as to make reading with that eye impossible. This haziness now began to fade away and in two hours the cornea was perfectly clear. The clouding appeared to involve the substance proper of the cornea and was uniformly distributed. There had been no pain, the ocular conjunctiva was absolutely free from congestion and with the exception of the cornea the eyeball seemed perfectly normal. It was impossible to see the fundus, so he was told to return that evening after the cloud had passed away, though I must confess that I was rather skeptical of any such result. He came back that night at 8 o'clock and the cornea was absolutely clear and bright. The ophthalmoscope showed a high grade of myopia at least 10 D. There was glaucomatous cupping of discs, but this condition was not by any means striking. The fundus as a whole resembled that which we generally see in very high grades of myopia. With his myopia corrected his vision in his affected eye was $\frac{20}{12}$, while the vision in the other eye was nearly $\frac{20}{20}$.

I prescribed eserine gr. j to ʒj to be used three times daily. This controlled the attacks completely and I lost sight of him until November, 1895. He said that for the past four years he had never noticed the clouding in the slightest degree during the spring and summer months, but each autumn the clouding was noticed, but it never lasted long, as he promptly resorted to the eserine. In November, 1895, the haze returned and he came to see me with the right cornea so opaque as to resemble a case of interstitial keratitis. The eserine even in a stronger solution producing no effect, an iridectomy was done.

Vision before the operation $^{20}/_{00}$, after $^{20}/_{XL}$. A month after the operation on his right eye the haze was seen for the first time before the other eye and the condition was characterized by the same periodicity. He consented to an iridectomy which was performed. The striking features in the case are:

1. The density of the clouding which exceeded anything of the kind that I had ever seen in glaucoma. Tension was elevated during these attacks and he was conscious of a dull pain in the temples.

2. The periodical nature of the attacks which came on at about the same time every day and passed away at about the same time. The fact, too, that he was entirely free from attacks during the warm weather though he was not using the eserine.

3. The co-existence of myopia and that too of such high grade. He is now wearing: R. E. — 10 D. $\bigcirc$ — 1.25 D. c. ax. 180° ; L. E. — 10 D. $\bigcirc$ — 1.25 D. c. ax. 180° .

LENTICULAR MYOPIA AS A CAUSE OF SO-CALLED
 "SECOND SIGHT." D. B. ST. JOHN ROOSA, M.D. (*N. Y. Medical Record*, January 2, 1897)

A great deal more is said among the laity than in the profession about the ability of old people to read without glasses. Very many of the people who are able to read fine type in old age without glasses are simply short-sighted. The myopia is not of high degree and although it may have existed from a very early age, is not generally recognized, because such persons are generally able to go about, see large objects and even recognize faces at some distance without glasses. But there is quite a number of cases, not myopic originally, in which the patient after middle life discards the ordinary glasses for presbyopia, and reads for years without glasses. Lenticular myopia occurs in such eyes; that is to say, the lens becomes more convex by swelling. This swelling, however, if it simply produce capacity to read fine type without glasses, is not attended with opacity; cataract does not occur, although, as is well known, all opaque lenses become increased in refractive power. The condition now spoken of is, so to speak, an abortive cataract, a swelling of the lens without opacity. The following case illustrates what happens in all cases of this class:

Sarah X. consulted me on April 29, 1878, with reference to glasses. She was rather a delicate woman, 41 years of age. Her eyes were watery. She had worn glasses for reading for three years.

Vision was $\frac{20}{XL}$ in the right eye, $\frac{20}{XL}$ — in the left eye. With a glass of + 1.12 D., the vision became $\frac{20}{XX}$ in each eye, and with a convex glass of 4.00 D. she could read Jaeger No. 1 at eight inches. These glasses did very well for eight years, when she again consulted me. She was then able to read No. 1 Jaeger at eight and three-fourths inches with her glasses.

On October 19, 1896, the patient again came under my observation. She said she had not used glasses for reading for more than a year, because she could read very easily without them. The vision in the right was $\frac{20}{LXX}$. With — 2 D. it became $\frac{20}{XXX}$. In the left eye her vision was $\frac{20}{OO}$, and with a — 3 D. it became $\frac{20}{XL}$. She had but half a dioptré of corneal astigmatism, with the rule. With + 2 D. she could read No. 1 Jaeger at eight inches with the right eye, being an increase in the refractive power of exactly that, as it was a glass of 4 D. that she formerly used for reading. With the left eye she could read No. 1 Jaeger fluently at eight inches with no glass, and ordinary type very easily.

The ophthalmoscope showed absolutely no lesion—the lenses were clear, the retina was sound. It is reported as a case of lenticular myopia, occurring after middle life, producing ability to read without glasses. It is a fair type of quite a proportion of cases of second sight, although, as was said in the beginning, most old people who are able to read fine print without convex glasses, are usually myopic, and have acquired no new capacity by the advance of age.

SUBCONJUNCTIVAL INJECTIONS IN THE TREATMENT OF CERTAIN DISEASES OF THE EYE.

By WILLIAM H. WILDER, M.D. (*Medicine*, December, '96.)

This method consists in the injection beneath the conjunctiva of two or three minims of a 1:1000 solution of corrosive sublimate or cyanide of mercury. This is done after anæsthetizing the eye with a four per cent. solution of cocaine by introducing a sterilized hypodermic needle beneath the con-

junctiva of the eyeball eight or ten millimetres away from the cornea.

During the last three years I have had frequent opportunities of using this treatment and have come to regard it as a powerful adjunct to the old methods in some diseases of the eye. Interstitial keratitis and sympathetic ophthalmia, in my experience, have not been relieved by this measure. It is efficacious in diseases of the iris and choroid of all varieties, when adhesions do not yield to atropine and antiphlogistic measures. In virulent acute cases it seems to be contraindicated until there has been some abatement of the inflammation.

It is not to be supposed that this means is to be employed to the exclusion of other well known and valuable remedies, and in a case of iritis we would not omit the atropine, hot compresses, leeches, constitutional treatment, etc., that experience has shown, are invaluable. It is not a panacea, but, as Gepner remarks, "it is an excellent method of treatment in those cases in which the administration of mercurials is indicated."

COLOR SCOTOMA IN ALBUMINURIC RETINITIS.

By HOWARD F. HANSELL, M.D. (*Philadelphia Polyclinic*, November 21, 1896).

Contrary to my previous experience and to positive statements in the most authoritative text-books, a case of albuminuric retinitis recently observed had the characteristic symptom of toxic amblyopia, namely, central color blindness. The general symptoms of interstitial nephritis were pronounced. The typical appearances of the retinitis of nephritis—the star-shaped figure in the macula, white circular plaques scattered here and there throughout the retina, a few minute hæmorrhages and moderate swelling of the nerves—were present. Vision equalled $\frac{20}{60}$, not improved by glasses. For a circular space measuring 10 to 15 degrees around the point of fixation on the perimeter, there was in each eye an absolute blindness for all colors, although the white test was perceived with the readiness consistent with the diminished acuity of vision. The existence of the color scotoma warranted the suspicion of either a cortical complication or that the patient was in the last stages of kidney disease when the blood became so loaded

with poisonous metabolisms, that we were dealing with a true toxic amblyopia. The assumption of Nuel (*Arch. d' Ophtal.*, March and August, 1896) that atrophy of the macular fibres in the optic nerve, persistently found in retro-bulbar ueuritis, of toxic origin, is consecutive to atrophy of the retinal elements in the macular region and is not the primary change, would seem to be supported by the existence of a color scotoma in our case, since the macular region in each eye was invaded by the changes common to albuminuric retinitis. No doubt the cells of the maculæ themselves were the seat of the minute grayish spots of exudation that have been described among the ophthalmoscopic signs of toxic neuritis. The death of the patient from interstitial nephritis six weeks after the ocular examination was made, strengthens the conclusion that the loss of color perception can be ascribed to disease of the maculæ and macular fibres in the optic nerves of uræmic origin. If examination of a sufficient number of patients in the last stages of Bright's disease confirms the observation made in this single case, the discovery of central scotoma would form an important indication of the speedy approach of a fatal termination.

REMARKS ON THE MANAGEMENT OF GLAUCOMA. By LEARTUS CONNOR, M.D. (*Journal of the American Medical Association*, August 26, 1896)

In concluding a paper on this subject the author says: In the management of glaucoma, such attention should be given the bowels, skin and kidneys as to secure the most prompt and complete elimination of the effete tissue metamorphosis. The diet should be so regulated as to admit only such articles and in such quantities, as can be perfectly digested. The liberal use of water internally and externally greatly assists in restoring the fluids of the body to a state of reasonable purity. The continuance of such diet and mode of life affords the largest hope of preventing future glaucomatous attacks.

Such medicines should be employed as are called for to remove the constitutional dyscrasia found in each case, as arthritic, gouty, syphilitic, etc.

In simple glaucoma with no increase of tension such treatment may suffice; but should there develop increased tension,

diminished visual field, pain, shallowed anterior chamber, myotics should be first employed (if they can be constantly watched) and if they keep the symptoms under control, nothing farther is called for. But if they are not well borne, or if at the end of a month, the visual field has diminished, then an iridectomy should be done. If the tension still persists, a sclerotomy should be performed and myotics again employed.

In acute inflammatory glaucoma, the tension must be promptly reduced by general treatment and myotics if possible, but if these do not act immediately in reducing the ocular tension and in keeping it reduced, an iridectomy must be promptly done.

Subacute glaucoma is managed along the same lines as the acute except that operative action may be delayed a longer time, though the rule should not be deviated from which demands an iridectomy in all cases that grow worse under general management and myotics.

Chronic glaucoma is managed in the same manner as the subacute except that iridectomy is contraindicated in cases of degeneration of the iris, the results of the operation in such cases being unfavorable.

Absolute glaucoma is treated only to relieve pain, if salicylate of soda fails, the treatment is exclusively surgical, sclerotomy, iridectomy and enucleation.

Hæmorrhagic glaucoma is rarely benefited by any operation, owing to the weakened condition of the bloodvessels within the eyeball. Hence if general and local medication fail, and pain persists, enucleation is the only resource.

Secondary glaucoma calls for specific treatment according to the condition inducing it. If it be an intraocular tumor, enucleate the eye; if it be a lens swollen from discission, extract the same and so through the list.

Finally, he who would do the most for a case of glaucoma, must not only be able to quickly detect the disease in the form of its acute exacerbation; to apply the local remedies or do the operation which will quickest and surest restore the normal intra-ocular currents; but he must be able to recognize the constitutional dyscrasia, underlying such acute attack and put in operation the wisest measures for its mitigation or removal.

PAMPHLETS.

"Infantile Dysauxesis." By C. Fisch, M.D.

"Syphilis of the Nose." By N. H. Pierce, M.D.

"Remarks on the Management of Glaucoma." By Lear-
tus Connor, M.D.

"The Sphenoidal Cavity and Its Relation to the Eye."
By C. R. Holmes, M.D.

"A Brief Note on a Perfected Series of Testwords, etc."
By Ch. A. Oliver, M.D.

"Epithelioma. Removal. Plastic Operation for New
Eyelid." By J. L. Minor, M.D.

"Gonorrhœal Iritis and Non-Suppurative Gonorrhœal
Conjunctivitis." By W. Cheatham, M.D.

"Submucous Linear Cauterization. A new Method for
• Reduction of Hypertrophies of Conchæ." By N. H. Pierce,
M.D.

MISCELLANY.

DR. WENDELL REBER has moved from Pottsville to 1208
Spruce Street, Philadelphia.

DR. H. V. WÜRDEMANN has removed his office to 128
Wisconsin Street, Milwaukee, Wis.

FROM the *Medical Record* we learn that Dr. Pagenstecher,
of Wiesbaden, has been called to England by Queen Victoria,
who is suffering from failing vision.

TO THE GENTLEMEN INTENDING TO ATTEND
THE MEETING OF THE WESTERN OPHTHAL-
MOLOGICAL, OTOLOGICAL, LARYNGOLOG-
ICAL AND RHINOLOGICAL ASSOCIA-
TION, APRIL 8 AND 9, 1897.

DEAR SIR:—Through the courtesy of the Central Passenger Committee persons attending the meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, to be held at St. Louis, Mo., April 8 and 9, 1897, will be granted a reduction in their return railroad fare only, under the following circumstances and conditions:

FIRST. Each person must purchase (not more than three days prior to the date of the meeting nor later than two days after the first day of the meeting) a first-class ticket (either unlimited or limited) to the place of meeting, for which he will pay the regular tariff fare of not less than 75 cents, and upon request the ticket agent will issue to him a certificate of such purchase properly filled up and signed by said ticket agent.

SECOND. If through tickets can not be procured at the starting point, the person will purchase to the nearest point where such through tickets can be obtained, and there purchase through to place of meeting, requesting a certificate properly filled out by the agent at the point where each purchase is made.

THIRD. It is absolutely necessary that a certificate be procured, indicating that full fare of not less than 75 cents has been paid for the going journey. It likewise determines the route via which the ticket for return journey will be sold, and *without it no reduction will be made*, as the rule of the Committee is that "No refund of fare can be expected because of failure of the parties to obtain certificates."

FOURTH. Tickets for the return journey will be sold by the ticket agents at the place of meeting at one-third the first-class limited fare, only to those holding standard certificates signed by the ticket agent at point where through ticket to the place of meeting was purchased, countersigned by the secretary of the convention, certifying that not less than one hundred persons holding standard certificates are present, and that the holder has been in attendance upon the convention, and viséed by special agent of the railway association requiring the last named supervision.

FIFTH. Tickets for return journey will be furnished only on certificates procured not more than *three days* before the meeting assembles, nor later than *two days* after the first day of the meeting, and will be available for continuous passage only: no stop-over privileges being allowed on tickets sold at less than regular unlimited fares. Certificates will not be honored unless presented within *three days* after the date of adjournment of the convention. It is understood that Sunday will not

be reckoned as one of the three days either before the opening date, or after the closing date of meeting. No certificate will be honored if issued in connection with children's half-fare tickets, on account of Clergy, Charity, Employes, or at less than regular agreed first-class fare.

SIXTH. Ticket agents will be instructed that excursion fares will not be available unless the holders of certificates are properly identified, as above described, by the secretary or clerk, on the certificate, which identification includes the statement that one hundred or more persons, who have purchased full-fare tickets of not less than 75 cents each, for the going passage, and hold properly receipted certificates, have been in attendance at the meeting, and by the stamp and signature of special agent of the railway association. A violation of the rules in certifying that the stipulated number was in attendance, when actually a less number of properly executed standard certificates were presented, will debar the offending organization from the further courtesies of this Committee.

SEVENTH. The certificates are not transferable, and the signature affixed at the starting point compared with the signature to the receipt, will enable the ticket agent to detect any attempted transfer. A transfer or misuse of certificates or tickets authorized under this rule will forfeit all privileges granted.

EIGHTH. A guarantee has been given the Central Passenger Committee, to redeem at full fares any return tickets procured by persons in attendance at this meeting that may be found to have been transferred, misused or offered for sale.

N. B. Please read carefully the above instructions, be particular to have the certificates properly filled and certified by the railroad agent from whom you purchase your going ticket to the place of meeting, as the reduction on return will apply only to the point at which such through ticket was purchased. Yours truly,

February, 1897.

A. ALT, M.D., President.

THE OPTHALMIC RECORD. January, 1897. This is the first number of a new series of this well-known periodical formerly edited by Dr. G. C. Savage, of Nashville, Tenn. It is now published in Chicago and under the editorship of Dr. C. A. Wood with an able staff of co-editors and collaborators. We congratulate the *Record* on its revival and wish it success and prosperity.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

MARCH, 1897.

NO. 3.

ORIGINAL ARTICLES.

A CASE OF PARALYSIS OF THE SUPERIOR
OBLIQUE IN NEPHRITIS.

BY HOWARD F. HANSELL, M.D., PHILADELPHIA, PA.

THE occurrence of sudden diplopia in a patient apparently in perfect health leads us immediately to the supposition that syphilis is the cause and, if we accept the statement of writers whose word is universally acknowledged as authoritative, with good reason. Alexander ("Syphilis and Auge") quotes Graefe as recording the circumstance that over one-half of his cases of paralysis of the external ocular muscles was syphilitic in origin. His own figures are 269 cases of paralysis of which 53.5 per cent. were syphilitic. In his "Neue Erfahrungen," where he pursues the subject a little closer, he says: "Syphilitic paralysis of the trochlear nerve, which is, moreover, very seldom, is never found as an isolated paralysis but always in association with paralysis of the oculo-motor, the optic, the abducens or the facial. In non-syphilitic paralysis the lesion is often found in the Pineal gland." But cases are not rare where the history of infection is positively denied and where there is absolutely no reason to believe the patient's statements are untrue. Other causes are traumatism, rheumatism, diabetes, tumor, peripheral neuritis, posterior sclerosis, cerebro-spinal diseases and nephritis. Several cases of neph-

ritic paralysis have been recorded. Knies ("The Eye in Relation to General Diseases") has recently seen several cases. 1. Abducens paralysis as the sole symptom in albuminuria of fifteen years' standing, following typhoid fever; it relapsed twice in a few months and then the patient died. 2. Left trochlear paralysis in contracted kidney of unknown duration; death in three months; hæmorrhages were found in the right optic nerve. 3. Complicated external ophthalmoplegia. The paralyses usually recover rapidly but often undergo relapses in the same or other muscles. The cause generally appears to consist of a hæmorrhage in the region of the nerve-roots or nuclei, possibly even in the nerve itself. Sclerosis of the nerves was found by Leber.

A case at present under treatment may be properly added to the few that have been published. Mr. H., aged 34 years, married, applied to me February 1, complaining of double vision in the lower right-hand field. He attributed his trouble to close application to his office work. The symptoms of paralysis of the left superior oblique were complete. The false image was always below the true, sometimes directly under it and again crossed to the right side. V., $\frac{20}{xx}$ in each eye when corrected by a 1 D. Cylinder ax. 90. There was no *lesion of the eye grounds* and no limitation of the fields for white or colors. The only change noted during the next fortnight was an increase in the diplopic field and a wider separation of the images.

The following notes of his general health have been kindly sent me by his family physician: The patient has had the ordinary diseases of childhood but has suffered from no condition within recent years that could have an influence upon his present illness. For the past five years, however, he has been troubled by obstinate constipation requiring the constant use of laxatives as well as a carefully selected and dietary and systematic exercise for its relief. While he had daily evacuations he felt in perfectly good health but if he allowed himself to become constipated he would experience headache, languor, a sense of abdominal distension, a disagreeable taste in the mouth, and a heavy odor to his breath. On February 1, an examination of his urine was made with the following result: Sp. gr. 1024, highly acid, albumen in large amount, granular epithelial casts, uric acid and crystals of calcium oxalate in

abundance. Two subsequent analyses showed a diminished amount of albumen although casts were still present, uric acid and oxalates having disappeared. Since February 7, three analyses have disclosed neither albumen or casts. In the early part of December, 1896, the patient had been examined and passed for life insurance, the same physician who has furnished the above facts had analyzed the urine and had found it normal in every respect.

The treatment consisted of a regulated diet and the administration of citrate of lithium and Bashaam's mixture.

Prolonged office hours, continued work at the near point, in the presence of uncorrected hyperopic astigmatism and the absence of out-door exercise with perhaps hurried and improper diet, contributed to the muscular paralysis by inducing exudation, fluid or solid, or hæmorrhage within the sheath of the fourth nerve or in its course at the base, in an individual whose nervous system was imperfectly nourished by blood, altered in its composition by reason of one of the chronic forms of Bright's disease. The absence of all retinal and optic nerve complications, found in 10 per cent. of cases of chronic nephritis, is an interesting fact, and may cast some doubt as to the causal relation of the kidney disease. Careful inquiry into the history and through physical examination, however, fail to demonstrate other causes and the acceptance of the diagnosis can not be held to be inconsistent with the conclusion, that the paralysis of the superior oblique has for its underlying cause the condition of the kidneys.

REPORT OF TWO CASES OF SCOPOLAMINE POISONING.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

CASE I.—S. H., aged 28 years, suffering from neurasthenia, esophoria, accommodative asthenopia and hypermetropia. Instilled twice within an hour four drops of a one-fourth of one per cent. solution of scopolamine hydrobromate. Refracted eyes and she went home. When she returned several days later she said that when she went home she was very weak and felt for twelve hours as though she were sinking

away and breathing was slightly difficult. Her husband thought she was nervous and did not send for a physician and she was all right the next morning.

CASE II.—Mrs. H., aged 34 years; blond, florid complexion. Very susceptible to drugs. Has hypermetropia. Instilled eight drops in each eye one-fourth of one per cent. of a solution of scopolamine hydrobromate within an hour. In fifteen minutes after the last instillation and before complete cycloplegia, her face became very much flushed and she said she felt dizzy and faint, although she did not lose consciousness. I had her lie down, and as she said she could not take morphine because of idiosyncrasy, I gave her whiskey at intervals. After an hour and thirty minutes she recovered completely and flushing of face disappeared. While under the systemic action of the drug the mouth was dry, face flushed, pulse 50 per minute, shortly after, 60 per minute, and gradually rose to normal. Respiration 15 per minute, gradually rising to normal. No hallucinations or delusions.

REMARKS.—While this is next to atropine, the best cycloplegic we have, it is dangerous to those who possess an idiosyncrasy to this or any drug. One should always inquire as to idiosyncrasy to drugs, or use an extremely weak solution, or keep puncta closed during and after instillation. A number of cases of poisoning have occurred from its use and it behooves us to be on our guard in using it.

DETACHMENT OF CHOROID AND RETINA BY CONCUSSION.¹

BY S. D. RISLEY, M.D., PHILADELPHIA, PA.

PATIENT, Mr. H., aged 29 years, was brought to me in consultation by Dr. Leavitt, of Trenton, N. J., November, 1896. He was suffering from violent left hemicrania which originated in the left eyeball. O. D. appeared healthy, V., $\frac{6}{10}$, but was unduly sensitive to light which caused throes of increased pain in the left eye. The left eye was totally

¹Read before the Ophthalmological Section of the College of Physicians of Philadelphia, February 23, 1897.

blind, but the iris acted consensually with that of the right eye, both to light and in accommodation. He gave the following history:

Two years ago, while gunning for ducks, a fellow sportsman discharged his gun heavily charged, with its muzzle but a few inches from the left side of his head. The report deafened him, he became giddy and nauseated, and placed his hand on his left eye with the impression that it had "burst" and "was lying on his cheek." There was at first violent and distressing tinnitus, which grew slowly better for a few days but has persisted up to the present time. There was no discharge from the ear, and no evidence of a rupture of the *membrana tympani* could be discovered.

The vision in the left eye was much impaired immediately after the accident, but the eye was not painful. The vision, however, grew steadily worse, until in about a year there was no longer any perception of light, although he was constantly annoyed by photopsies.

The tension of the left eye was subnormal, but the ball was not soft. The cornea and lens were transparent, but only a faint red reflex could be obtained through the narrow pupil. The pupil dilated large medium under cocaine and homatropine. No view of the optic nerve was possible, but the retinal blood-vessels could be traced far forward over a dark red undulating surface, except in the upper inner quadrant of the ophthalmoscopic field, where they could be faintly discerned apparently in situ.

The case appeared to be one of detachment of both the retina and choroid.

The accident is certainly an unusual one. I know of no other instance of detachment of the retina from concussion. The total blindness is not readily explained except upon the supposition that there was at the time of the accident a retro-bulbar hæmorrhage also. It is probable that extensive detachment of the choroid and retina occurred at the time of the explosion, which caused the "bursting" sensation he experienced and the immediate impairment of vision; while the increasing blindness ending in total loss of light perception at the end of a year was due to atrophy induced by the retro-bulbar hæmorrhage.

ANOTHER CASE OF TUMOR OF THE PALPEBRAL
(ACCESSORY) LACHRYMAL GLAND, INCLUD-
ING SOME REMARKS ON TUMORS OF
THE ORBITAL LACHRYMAL GLAND.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

[*With Micro-Photographs.*]

IN NO. XII, VOL. X, of this Journal, pages 370 and 371, I reported a case of adeno-carcinoma of the *palpebral* lachrymal gland, which I then considered to be unique, as I could nowhere find the description of a similar case in the literature at my disposal. In making this statement I had in my mind the fact that the *orbital* lachrymal gland as far as I knew was not involved in this case. I have not, to this day, seen a report of a similar case. Tumors of the orbital lachrymal gland, of course, have been observed and examined histologically quite a number of times. My own experience in this direction includes up to date eight tumors of this, the main lachrymal gland. Seven of these I reported in a paper read before the National Association of Railway Surgeons, held in St. Louis, April 26, 1896.

I there stated (*Medical Review*, Vol. XXXIII, No. 20):

"It has been my good fortune to personally examine seven tumors of the lachrymal gland, three of which I have myself removed and reported in *Knapp's Archives* and the *AMERICAN JOURNAL OF OPHTHALMOLOGY*. I have of late again studied my specimens very carefully and with the following results: Five of the tumors may be considered as being to some extent of an epithelial character, two show no epithelial structure whatever.

"Of the five tumors showing epithelial structures there is only one in which this character is throughout the tumor the prevailing one. In fact, so closely does this tumor follow the normal appearance of the lachrymal gland that I described and published it as an adenoma. The connective tissue between the glandular structures is also increased, but not to any very large extent.

"The four other tumors which also show an epithelial character and which in their structure seem to be very much like those described by O. Becker as adenoids, are but little different from each other. The more I have studied them the more have I become convinced, that the epithelial tissue found in them must be looked upon as the remnants of the original glandular tissue which are in places somewhat hypertrophied, but that there is hardly any newformation of glandular tissue and that in consequence the real character of these tumors is not that of an epithelioma or a glandular carcinoma. The bulk of the tumors is made up of myxomatous and cartilaginous tissue, by which the glandular structures are widely pressed apart and probably have atrophied and totally disappeared in places. The epithelial tissue still found shows, as a rule, a glandular, tubular arrangement of the cells around an open lumen. There are here and there cystic enlargements, which show that some secretion has been going on, while the growth progressed. In some places small colloid bodies are found, probably metamorphosed cells.

"The sixth tumor of the lachrymal gland, which I examined was a spindle-cell sarcoma of the purest type. It consists simply of smaller and larger spindle-cells closely packed with no visible intercellular substance and some round cells in the younger portions. I may state, that this tumor had grown back into the orbit and produced a straight forward exophthalmus with absolute abolishment of the motility of the eyeball. The patient died later on of multiple spindle-cell sarcoma in all important organs.

"The last tumor of the lachrymal gland, I removed, was so soft, that when on incision the thin capsule was opened the contents oozed out as a granular sticky mass. As the forceps could nowhere get a hold of it, I had to squeeze it out before I could thoroughly remove the capsule. It proved to be a chondro-sarcoma. There is not a trace of glandular tissue to be found in this tumor. The only other tissue it contains is here and there a microscopical spicule of bone. There are also some colloid bodies in this tumor.

"The number of tumors of the lachrymal gland here considered is, of course, not a large one in itself, although not so small when compared with the whole number of cases reported in literature. Yet, with the exception of the case, which I

consider to be an adenoma, the remaining ones are chiefly characterized by connective tissue formation, not by an epithelial structure. I do not think, therefore, that I am wrong when concluding, that the tumors of the lachrymal gland very frequently take their origin in the interstitial connective tissue and only in the rarer instances are truly epithelial in character.

"Lymphoma, lymphadenoma, tubercular tumors and chloroma of the lachrymal gland, as have been described in a number of instances, I have not had an opportunity to see."

I have since had occasion to examine one other tumor of the orbital lachrymal gland, which will be reported elsewhere, and which proved to be a scirrhotic carcinoma.

I wish now to report a second case of tumor of the *palpebral* (accessory, conjunctival) portion of the lachrymal gland, independent of the orbital portion.

C. T., a negro, aged 29 years, came under my care on account of an ulcer of the left cornea, in September, 1896. He stated that three years previously he had been under the care of some oculist in Cincinnati for an ulcer of this same cornea and that the eye though quiet had been of little use to him. The present ulcer was superficially located in the old scar and healed promptly under treatment.

When the patient first consulted me I noticed that not only did his left eye protrude somewhat, when compared with its fellow, but this protrusion was apparently directly due to a swelling under the very loose upper lid, which occupied the outer third of it. When I lifted this lid up a flat, lobulated tumor was exposed of about the size of an almond, which was covered by the conjunctiva. This tumor was very painful to the touch and was evidently very hyperæmic. When I questioned the patient with regard to this growth, he stated, that he first noticed it four years previously and that the oculist who treated him three years ago, had wanted to remove it and that now he was ready to have it removed as it caused him considerable and almost continuous pain.

Just about this time I had carefully perused E. Bock's booklet on the lachrymal gland in health and disease (*Zur Kenntniss der gesunden und kranken Thränenendruese*. Wien, 1896, Josef Safar), in which this author gives the results of his especial examination into the conditions of the lachrymal gland (he speaks almost solely of the accessory one) in about

1,000 persons, with the anatomical examination of 10 orbitæ post-mortem. From his researches it seems that the accessory lachrymal gland (aside from the new-growths) is much more frequently diseased and swollen, than has been commonly known. This swelling of the gland may be due to acute and chronic adenitis, that is, a primary inflammation of the gland-tissue, or secondarily to inflammation induced by affections especially of the cornea or conjunctiva. In these cases Bock considers the glandular inflammation to be produced by microbic infection or irritation by microbic products by way of the excretory canals. He also states that the size of the acces-

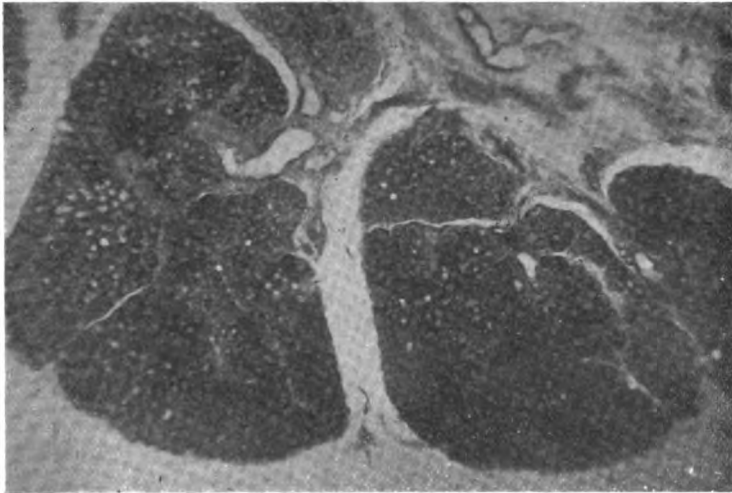


FIG. 1.

sory lachrymal glands varies considerably in health. Among 176 healthy individuals he found them invisible in 130 cases; visible in both eyes in 31 cases, the size varying from that of a pea to that of a bean. In 11 individuals the gland was visible on one side only.

Thinking of the possible connection between the ulcer of the cornea and the evident immense swelling of the accessory lachrymal gland in this eye, I questioned the patient very minutely, as regards the history of the growth. What I elicited, however, proved that I had to deal with a steady growth,

independent and apparently uninfluenced by the intercurrent ulcer of the cornea. The healing of the ulcer made no difference in the behavior of the growth.

At the patient's desire I removed this tumor a few weeks after the cornea was perfectly healed. The removal was followed by a very profuse arterial hæmorrhage which was stopped with difficulty only. The healing was uneventful and there has been no further trouble since.

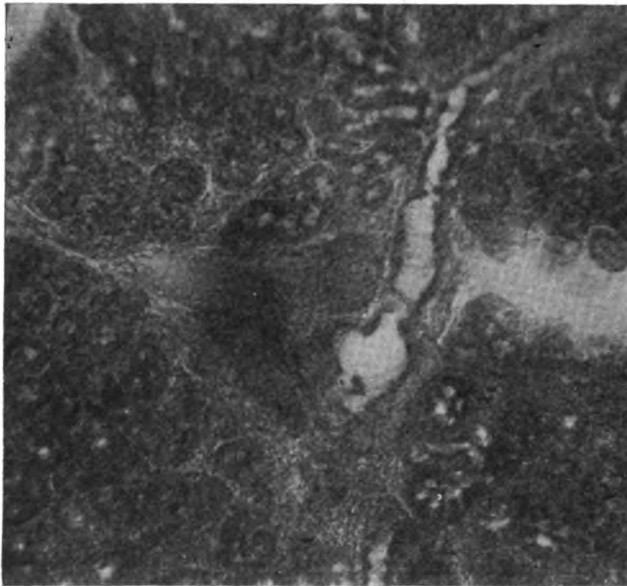


FIG. 2.

The size and shape of the tumor, when removed, was that of a small almond, thicker in its lower portion (near the conjunctiva). It was lobular in some parts, these lobules differing from the normal ones only by being larger, than what I have usually seen (Fig. 1). In another portion, the part which lay nearest the outer canthus, the growth was solid and nodular.

Microscopically the tissue consisted in the main of glandular tubules of three different kinds. First, remnants of the normal glandular tissue. These tubules retained a central lumen and they were more particularly situated near the secretory ducts; their cells appeared dimmed and granular and

their nuclei did not stain well, as if in the act of secretion. Second, tubules which appeared solid and without a central lumen. Their cells did not differ much from those of the normal parts. Third, a series of glandular tubules which had a very wide central lumen, sometimes forming cyst-like cavities (Fig. 4). The glandular tissue forms large lobules, yet there are smaller and very small ones, which may be new formations. This is, however, undecided, as very small glandular lobules apparently without canals are found also in the norm.

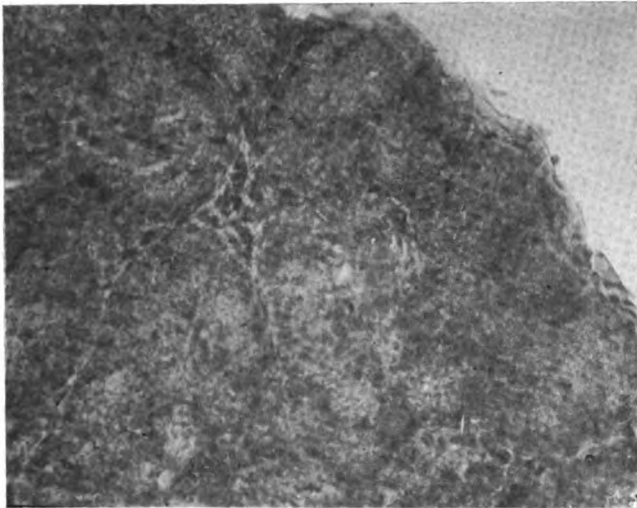


FIG. 3.

The connective tissue septa between the glandular tubules and the lobules had in parts almost disappeared, so that the tubules (Fig. 3) and formerly separated lobules touched each other; they were still in something like the normal breadth between the more normal lobules and near the excretory canals, where these were found. This connective tissue was filled with round cells, in some places in such numbers as to produce the picture of microscopical abscesses (Fig. 2). Round cells were also found throughout the glandular structures. The blood-vessels in the periphery were mostly very wide and filled with blood, within the glandular tissue and in the septa some were partially, some totally obliterated.

The conjunctiva covering the tumor was greatly infiltrated and the epithelial layer was several times its normal thickness. It, furthermore, abounded in mucous cells. These are the cells which are usually called goblet-cells, although the comparison with a goblet in this instance seems rather far-fetched. The cells in this case (and in a number of others of which I have sections) appear like balloons, tied at the end, where they lie at the surface (Fig. 5). They are stained deeply with hæmatoxyline or Bismark-brown, while with eosine or carmine they are barely tinted. Such cells were frequent also in the epithelium lining the excretory canals.

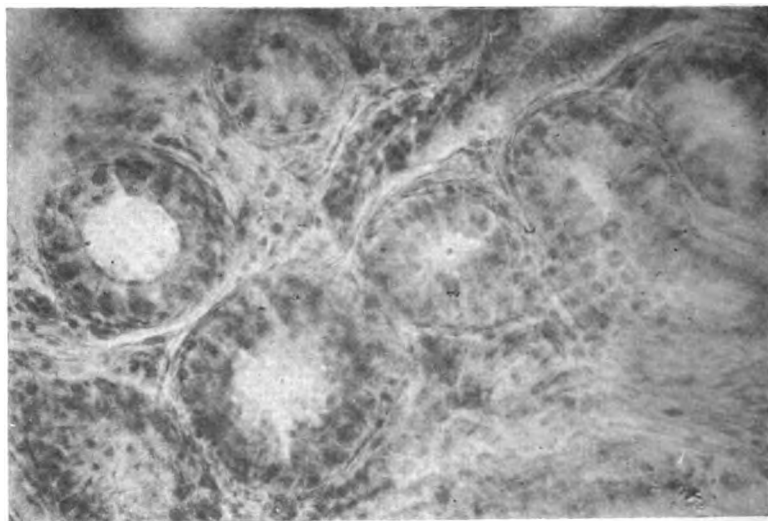


FIG. 4.

I consider this to be a case of *adenoma of the accessory lacrimal gland*.

Several other histologists to whom I showed specimens concurred with me in this opinion without hesitation. As I surely had not to deal with a normal, but overgrown, accessory gland, the question could but lie between dakryadenitis and adenoma. I think, however, that what I have described in the preceding pages can leave no doubt as to the nature of a pathological new-growth.

In confirmation of my view, I may here add what Ziegler says concerning the histology of adenoma:

"Adenomata differ from glandular hyperplasia macroscopically by the fact, that the new-growth is well differentiated from the surrounding tissues by its consistency, color and anatomical structure. They are usually nodular tumors which originate in glands or in mucous membranes and epithelial coverings which contain glands. In the first case, we find mostly but a part of the gland changed into a tumor-nodule.

* * *

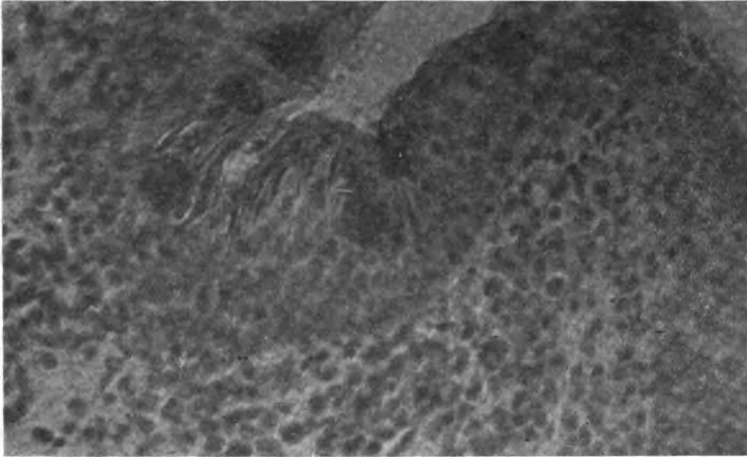


FIG. 5.

"The histological structure of the adenoma always differs more or less from the normal structure of the diseased organ. Although it forms a typical structure it is not exactly like its mother tissue."

Thus in the tumor under consideration we have swollen glandular lobules and a larger, harder nodule, which consists of glandular tissue differing, however, in structure from the mother tissue in that part of its tubules are solid, part have considerably enlarged lumina, so that we might almost speak of a cyst-adenoma.

A CASE OF CHLOROMA.¹

BY S. C. AYRES, M.D., CINCINNATI, OHIO.

WITH ADDITIONAL MICROSCOPICAL EXAMINATION AND
PHOTOGRAPH.

BY ADOLF ALT, M.D., ST. LOUIS.

IT IS possible that the subject of chloroma is as new and rare to many of you as it was to me when the case I have to report came into my hands. It only came into my service at the Ophthalmic Hospital because the neoplasm had invaded the orbits and produced a marked exophthalmus. In the *American Journal of the Medical Sciences* for August, 1893, appears a paper entitled "Chloroma and Its Relation to Leukæmia," by Dr. George Dock, of Michigan, in which he reports a case. He has examined the literature of all languages and collected, including his own, seventeen cases of chloroma.

Edward Ludwig, aged 7 years, was admitted to the Ophthalmic Hospital May 18, 1893. His parents are living and in good health. There are five other children in the family, all of whom are healthy.

PREVIOUS HISTORY.—He has always been a bright, intelligent boy and has never suffered from any serious illness. He has had repeated attacks of parotitis (?) and the present trouble seems to have followed one of these attacks. He at first complained of pain in both orbital regions, at the same time both eyes seemed to be more than usually prominent. After a week or more, his mother noticed some impairment of his hearing, which slowly increased. The exophthalmus increased more rapidly. He became very weak and somewhat emaciated, and complained of a severe pain in the left foot, on account of which he was unable to walk.

¹We republish this paper, read before the Section of Ophthalmology of the American Medical Association, May, 1896, and published in the *Journal of the American Medical Association* of November 7, 1896, at the express desire of our esteemed collaborator, as he hopes it will thus reach more readily a public to which it must be of especial interest and since a microscopic examination of parts of the tumor was offered us.—[EDITOR]

Upon his admission into the hospital both globes were very prominent, but the right more so than the left. It was with difficulty that he could close the lids of the right eye over the ball. The corneæ are clear and there is no impairment of vision. The conjunctivæ of both eyes are red and chemotic. The motility of the eyes is unimpaired. In the upper and outer portion of the right orbit can be felt a dense, inelastic growth which protrudes beyond the edge of the bone. A similar growth can also be felt in the left orbit, but not so pronounced. The optic papillæ are somewhat pale, but there are no other alterations in the fundus of either eye. His hearing is so much impaired that he has to be spoken to in a loud tone. Pulse, 120 per minute; temperature, normal. There is no lesion of any of the cranial nerves. Muscular power and sensation of both upper and lower extremities normal. Pressure on the sole of left foot produces pain, but there is no redness or swelling in this locality.

May 21. The proptosis of the right eye has increased, but that of the left is apparently slightly less. There has developed a swelling in both temporal regions. They are rounded and elastic, without any sensation of fluctuation.

May 23. Protrusion of both eyes increased; corneæ hazy and covered with inspissated mucus.

May 27. Temperature, normal; pulse, 120. Patient complains of some difficulty of micturition; later on, retention of urine. Both corneæ are quite opaque. The swellings in the temporal regions more pronounced. There has developed a hard, firm swelling in the region of each parotid gland. Intelligence good; hearing somewhat improved. Pain in foot still present. No appetite. The exophthalmus of both eyes increases day by day. Both globes are now forced beyond the palpebral fissure.

June 2. Condition worse in all respects. He has had a severe hæmorrhage from the conjunctiva of the right eye.

June 5. Died this morning as result of hæmorrhage from the conjunctiva of the right eye.

Three days before death, blood pale and watery. Staining according to the Ehrlich method showed a marked increase in the number of white blood corpuscles, the increase being due principally to the number of multinuclear cells, while the small lymphocytes and those white cells characteristic of splenic and myelogenic leukæmia are not increased. Eosinophile cells are sparingly present, not above 2 per cent. The examination of the blood at this time justifies the diagnosis of leucocytosis only, and not leukæmia. Furthermore, an

examination of the patient revealed no enlargement of the lymphatic glands except those of the neck.

The post-mortem examination was made about twenty-four hours after death: Body fairly well developed and nourished; post-mortem rigidity well marked, the upper and lower extremities normal. No evidence of subcutaneous hæmorrhages. Marked swelling of the lymphatic glands about the neck. Both eyeballs protrude to such an extent that they are only partly covered by the eyelids; sloughing of both corneæ. Traces of blood about the eyes, mouth and nose. Mucous membrane of mouth swollen; teeth covered with blood. To the touch the lymphatic glands are firm and resisting, with no sign of fluctuation. A small nodular infiltration over the right parietal bone near the median line. On cutting through this swelling it was found to be situated beneath the periosteum, and although there was no evidence of its having arisen from the bone, the latter was at this point remarkably thin. No trace of inflammation or infiltration of the pia mater or the brain. The brain was found to be intensely anæmic. On removing the brain the orbital plates were seen to bulge upward owing to the pressure from within. After removing the very thin orbital plates, both cavities were found filled with a firm, solid, and somewhat elastic mass of a light greenish color, which pushed the eyeball forward. This mass was removed with some difficulty, although only at one point did it seem to be firmly adherent to the periosteum lining the orbital cavity. Here the bone was somewhat eroded. Behind, the new growth extended to the sphenoidal fissure, surrounding but not involving the optic nerve. In front and above, the newly formed tissue extended to and a little beyond the orbital arch. On superficial examination the new growth seemed to be confined to the orbital cavities; a further examination showed this not to be the case, for the cancellous tissue of the sphenoid and the petrous portion of the temporal bones were softened and infiltrated with a dirty greenish-yellow fluid, looking very much like pus. On the left side in the petrous portion of the temporal bone was an area in which the bone tissue was completely destroyed and filled up with a material such as was found in the orbits, differing from it only being of a more dirty greenish-yellow color, and not quite so firm. The lymphatic

glands presented the same appearance in section as did the tumors of the orbits.

Equally as interesting proved the further examination of the new growth. On having placed the tumor in alcohol, the color disappeared entirely within twelve hours. On the other hand, the specimen kept within a tightly corked bottle, still retains the greenish color; in fact, the color has become even more marked. Some of the fresh fluid taken from the interior of the sphenoid bone was examined, but revealed only the presence of large numbers of small corpuscles, fat globules and granular detritus.

The section of the tumor after being hardened in alcohol and ether seemed to justify the diagnosis of sarcoma, the cells being almost entirely of the small round variety, none or very few spindle cells, and remarkably little intercellular substance; no large blood vessels, but numerous lymph spaces. Furthermore, the small round-celled infiltration extended into the upper eyelid down to the yellow elastic cartilage.

The seat of the tumor, the peculiar color, the history of the growth, the remarkable involvement of the lymphatic glands, the results of the microscopic examination, make this case one of a few that have been put on record under the head of chloroma, cancer vert, the green cancer of the French.

Whether the form of tumor should be called a sarcoma, whether it is of the so-called connective tissue variety, or on the other hand, as Dock would seem to believe, a peculiar condition arising in the course of true leukæmia, the tumors being regarded in this case as lymphomata—these are questions which the future must decide. Dock and a number of others have found by an examination of the blood that they were contending with true leukæmia. My examination of the the blood, as already described, showed a remarkable increase of white blood corpuscles, but they were indicative only of a marked leucocytosis, and not a true leukæmia. This examination was made three days before death. However, there is still a great deal of obscurity about leukæmia as to its true nature, and when we consider that some writers have suggested the name of sarcoma of the blood for this disease, we can not wonder that in the case of chloroma the pathologic conditions found were suggestive of leukæmia.

I am greatly indebted to Dr. Greiwe for the above report

of the post-mortem and of his microscopic examination of the growths. His views, while they may differ from other investigators', are founded on examinations made of the neoplasm removed from different localities. It is very unfortunate that the post-mortem did not include the thoracic and abdominal cavities. A more complete examination might have thrown some light on the tissues invaded by this strange disease.

In all the prominent diagnostic points my case seems to correspond with the one reported by Dr. Dock, as well as most of those he has so carefully collected.

COLOR.—In color it was a yellowish-green, or perhaps a pea-green. It did not vary much in the different localities, but was more pronounced in the larger masses.

CONSISTENCY.—This differed in different localities. It was homogeneous and without fibrous septa. I have described the cut masses as presenting a smooth, shining jelly-like appearance.

INVOLVEMENT OF PERIOSTEUM AND BONE.—Most of the cases show involvement of the periosteum, and in this case it was marked, but more than this an actual softening of the bone. Dr. Greiwe in his report says that "the cancellous tissue of the sphenoid and the petrous portion of the temporal bones were softened and infiltrated with a dirty greenish-yellow fluid, looking very much like pus." On the left side in the petrous portion of the temporal bone was an area in which the bone tissue was completely destroyed and filled up with a material such as was found in the orbits, differing from it only by being of a more dirty greenish-yellow color, and not quite so firm.

DURATION.—From the report of the mother it seems that she noticed the exophthalmus only four weeks before she brought him to the hospital. He died in two weeks after he was first seen. Allowing two weeks to elapse in which the changes were not detected by the parents, the disease ran its course in the short period of two months. After he was first seen the growth was exceedingly rapid and could be noticed day by day.

HÆMORRHAGE.—Epistaxis is mentioned as occurring in some of the cases of chloroma reported. In Ludwig's case there was severe hæmorrhage from the conjunctiva of the right eye. This occurred in my patient the day before he died, and

then on the following day recurred with such violence as to destroy his life.

RETINA.—The eyes were carefully examined and no swelling of the optic discs and no retinitis was found. The discs were pale and anæmic, but not atrophied. His vision was good. In a short time the cornea became so involved that further inspection of the fundus was impossible.

EXOPHTHALMUS.—This was pronounced and was the first symptom that attracted the attention of his parents. The exophthalmus increased slowly in both eyes, but more in the right, and in a week from the time he was first seen the proptosis was so great that he could not close the eyelids, and in consequence the cornea ulcerated.

EXCITING CAUSES.—There is no known exciting cause in this case, but his illness followed an attack of parotitis. His mother said he had had several attacks of so-called parotitis. It is not probable that these attacks were true mumps, but precursors of the development of the disease.

DEAFNESS.—Deafness was a marked feature. It varied slightly in severity from day to day, and it was always necessary to speak to him in a loud tone. He had no catarrh and there was no otorrhœa. The drum membranes were not examined.

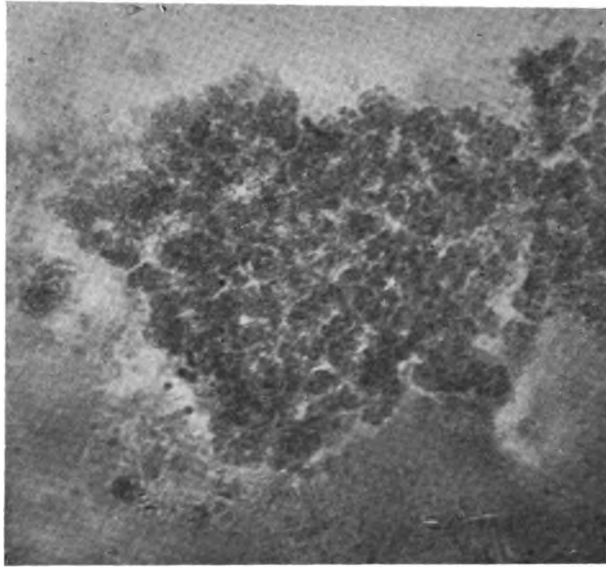
Dr. Dock says: "From what we do know of the natural history of leukæmia and of chloroma we can see the analogies of the diseases. We can say that chloroma is a lymphomatous process similar in its clinical features to leukæmia and pseudo-leukæmia. Our ignorance of its precise relations depends partly on the fact that our knowledge of chloroma is very incomplete, partly on the indefinite nature of leukæmia and pseudo-leukæmia."

RESULTS OF THE MICROSCOPICAL EXAMINATION.

The parts of the tumor kindly sent me by Dr. Ayres were kept in a formol solution. They consisted of two pieces of the growth one larger and more consistent than the other. Both were of dark grass-green color. The preserving fluid also was dirty, greenish, and looked fatty.

After proper embedding I made sections of the larger and more solid-appearing piece.

In unstained sections the tissue is found to consist chiefly of small and larger round elements containing fat globules, although in one part of the tumor fibrous tissue predominates. The round elements seem to lie rather loosely together and are held by an intercellular substance which is hardly visible. Between these round cells which all have a greenish tint there lie aggregations of varying sizes composed of larger and darker bodies which are totally filled with or altogether consist of small fat or oil globules. Their shape is not exactly similar to any cell. These bodies are much more numerous in some parts of the tissue than in others. (See Figure).



The tissue takes up all the different kinds of staining materials, but poorly, nuclei can not be demonstrated and it does not photograph well therefore. Whether this is, as I should take it, a sign of partial disintegration of the tissue elements, or whether this is characteristic of the chloroma and due to the fat globules, I do not know. Yet, the latter is not probable, since the large bodies, more particularly filled with fat globules, take up more stain than the rest of the tissue.

When examining the preserving fluid in which the pieces of the tumor reached me, I found besides innumerable such

bodies with fat globules the whole green fluid pervaded by octahedric crystals of perfect purity, but varying in size. They are in no way different from crystals of oxalate of calcium as we find them in the urine. When I allowed the fluid to evaporate, larger droplets of a dark green oily substance and these crystals filled the field.

Ziegler says: "Chloroma is a round cell sarcoma very rich in cells, characterized by a light green or dirty brown-green color and which, according to our present knowledge, springs from the cranial periosteum. According to Huber and Chiari the coloring substance resides in small globules contained in the cells, which give the microscopical reactions of fat. I can confirm these statements from the personal examination of an orbital chloroma."

What I have found in the specimen under consideration differs from this description in so far only, as the aggregation of colored bodies consisting almost altogether of the globules, (as in the illustration here added), are not mentioned.

What significance, if any, the oxalate of calcium crystals present as to the nature of the disease, I do not venture to say.

A BRIEF NOTE UPON A PERFECTED SERIES OF TEST-WORDS INTENDED FOR THE DETERMINATION AND ESTIMATION OF THE POWER OF ACCOMMODATION. By CHARLES A. OLIVER, M.D., (*Archives of Ophthalmology*, No. 2, 1896).

Dr. Oliver, after ten years of constant employment of his series of metric test-letters presents a perfected series. The change in the order of the words; the substitution of a black hardwood frame for the gray cardboard mat; the exchange of the movable blocks of letter groupings to a single exquisitely etched steel plate; the fine white tint, and the even, unpolished, smooth surface of the printed area; and the clear, cleanly cut imprint of the engraved letters with a dead black ink, may all be cited as some of the most important reasons why this series has been issued. Made by Wall & Ochs, 1702 Chestnut Street, Philadelphia.

SOCIETY PROCEEDINGS.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

EDWARD NETTLESHIP, F.R.C.S., President, in the Chair.

THURSDAY, JANUARY 28, 1897.

Spontaneous Recovery of a Retinal Detachment. By DR. LAW-FORD KNAGGS.

A woman, aged 21, was shot in the right temple on May 21, 1892. The bullet passed below the right orbit and lodged in the floor of the left antrum. The wound healed quickly. Attention was drawn to the right eye by the patient's complaints of inability to see things in certain portions of the field. Two choroidal ruptures near, and œdema around, the macula, and several large hæmorrhages were seen on the 22nd, and from that date till the early part of July an acute attack of central choroiditis, with much effusion, was observed in its various stages. At the latter date a large mass of white lymph occupied the vicinity of the macula, and was surrounded by a broad frame of pigment, over which several vessels curled, to be buried beneath the mass of lymph. On July 27, a detachment of the retina had formed, which, when seen end-on, was of the shape of a wedge of cheese with its apex uppermost. The top of the detachment formed a ridge, which ran horizontally backwards till it merged in a track, which disappeared beneath the inflammatory mass overlying the macula. The front of the detachment probably reached to the ora serrata. The field showed scotomata corresponding exactly to the central mass and the detachment. The patient was not seen again till November 28, 1894, when the detachment was found to have disappeared completely, and the reappplied retina to be quite normal in appearance. The central mass had become

more triangular in shape, but the track which had led to the detachment was still visible. The scotoma caused by the detachment had gone, and that dependent on the central disturbance had slightly contracted. Central vision was destroyed. The condition was unchanged some time later. There could be no doubt that the detachment was produced by exudation gravitating after expression from the central mass of inflammatory tissue, or possibly from a concealed detachment behind it. A detachment produced by inflammatory serum, whose natural tendency was towards absorption, differs essentially from a detachment where the subjacent fluid is a passive effusion filling a potential vacuum. Detachments of the retina are divisible into three groups:

1. Those occurring in fairly healthy eyes as a result of concussion in some form, as in coughing, blows.

2. Those where it is the direct result of inflammatory effusion dependent on severe traumatism or on some organic disease.

3. Those met with in eyes which are the subjects of some chronic disease, such as myopia, where degenerative as well as inflammatory changes may share in the production.

In Groups 1 and 2 spontaneous recovery is more probable and surgical treatment more hopeful (in suitable cases) than in Group 3. These statements were illustrated by reference to recorded cases.

Remarks were made by the PRESIDENT and MR. CANT.

Retention Cyst of the Lachrymal Gland or "Dacryops." By MR. ARNOLD LAWSON.

The patient was a young married lady, aged 19. The tumor had been growing for about four months when first seen. It caused a swelling in the upper and outer part of the left upper eyelid, and was accompanied by considerable ptosis, slight proptosis of the globe downwards and forwards, and slight limitation of movement upwards. On raising the upper lid a soft elastic tumor immediately bulged forwards between the lid and the globe. The tumor was obviously cystic, and had a dark bluish appearance. The skin moved freely over it. There was no glandular enlargement, no pain, and the general health was excellent. The tumor, which grew rapidly whilst under

observation, was removed by dividing the external canthus, and having by this means everted the lid, an excision through the fornix conjunctivæ completely exposed the anterior surface of the tumor. It was then shelled out without much difficulty. It lay perfectly free and non-adherent, except along its anterior surface, where it was attached by tags to the sub-conjunctival tissue of the lid and at its outer margin where it seemed to be adherent to the lachrymal gland. The cyst measured 40 mm. in length, and 22 mm. in breadth at its thickest part, and bore a remarkable resemblance in size and shape to a pigeon's egg. Its walls were of extreme delicacy and very translucent. It proved to be an unilocular cyst with a very shaggy inner wall, and contained about $\frac{3}{4}$ of a pale straw-colored limpid fluid with a small sediment. Microscopically, the cyst wall was found to consist of a very delicate, loose, wavy, and elastic areolar tissue, denser and more felted toward the external wall. There was a remarkable absence of the cellular element, and it was only after repeated examinations of many sections that any cells could be found lining the cyst wall. Ultimately a few clusters of very minute cells with large nuclei were found scattered here and there in a few of the sections. The cells were of irregular shape and grouping, but strongly suggested a glandular origin. The cyst fluid was neutral, of a light specific gravity, and contained a fair amount of albumen, and a distinct trace of chlorides. The chief feature of the fluid was the presence of numbers of homogeneous bodies presenting great variety of size and shape. They were almost transparent, but stained readily. There were also present large numbers of leucocytes and red corpuscles, both floating free and also adherent to the bodies and embedded in them. The presence of fibrin in these bodies was demonstrated by staining after Weigert's method, and they were considered to be probably small detached masses of an albuminous nature, which had been coagulated, the precipitation of the albumen being brought about by the presence of alcohol, in a weak solution of which the cyst was lying for some days before examination, and the coagulation resulting from the formation of fibrin from the blood elements in the cyst. This theory was supported by the constant presence of adherent and embedded leucocytes in these bodies. As a further explanation, a positive analogy was suggested between

the bodies and hyaline casts, probably derived from some protoid of the renal epithelium, the urine in which they were found being nearly always albuminous. The presence of the epithelial lining to the cyst, the glandular type of the cells, the situation of the cyst, the presence of sodium chloride in the fluid, and the limpid character of the fluid itself, point very strongly to its being a retention cyst of the lachrymal gland, a disease of extreme rarity. A parasitic origin was suggested for the cyst on account of the curious bodies in the fluid, but the nature of the cyst wall placed such a diagnosis out of the question.

Remarks were made by MR. MARSHALL.

Card Specimens. The following were the card specimens :

DR. MACNAUGHTON JONES: "Case of Congenital Closure of the Lachrymal Punctum, and Absence of the Canaliculus."

MR. WORK DODD: "Peculiar Changes in the Fundus Oculi."

MR. JULER: "Changes in the Macula." MR. J. GRIFFITH:

"Arrest of Development of Lens." MR. DOYNE: "Retinal

Hæmorrhages." MR. TREACHER COLLINS: "Hæmorrhage

Into the Sheath of the Optic Nerve." MR. JESSOP: "Detach-

ment of the Retina." MR. HIGGINS: "Two Eyes Lost by Spontaneous Hæmorrhage After Extraction of Cataract."

OPHTHALMIC DIGEST.

By J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

RECURRENT PTOSIS. REPORT OF A CASE, WITH ANÆSTHESIA OF SUPRAORBITAL BRANCH OF THE FIFTH CRANIAL NERVE. By W. H. HAYNES, M.D. (*New York Medical Journal*, Feb. 13, 1897).

Kate T., eleven and one-half years of age, a bright school girl of Brooklyn, with a negative family history, and a medical history of attacks of whooping-cough, measles, and chicken-pox, with attacks of headaches at times. In September, 1896, one week after school opened, felt headache in the top of her head and over eyes, without nausea, and mother noticed that she did not open her right eye, which was full of water; lids stuck together on awakening in the morning, eye felt sore, and it was thought she had taken cold. Four days later, I saw her and the following conditions were noticed: A well-nourished girl, suffering pain in the top of her head and right eyeball; says sight of that eye is foggy. Right upper eyelid covers upper half of that eyeball. There is no discharge present, but there is loss of tactile and pain sense throughout the right half of the forehead and temporal region covering the distribution of the supraorbital branch of the trifacial nerve of that side. Otherwise she is perfectly well.

The diagnosis of migraine with ptosis and anæsthesia of supraorbital branch of the fifth nerve was made and treatment given, first of bromide of sodium, then of arsenic, without apparent benefit, and finally at Dr. John C. Shaw's suggestion, $\frac{1}{300}$ grain of aconitine (Duquesnel's), three times a day, which caused disappearance of the pain and apparent gradual recovery of power over eyelid; so that six weeks after attacks began she could elevate the lid as well as the other; sensation had wholly returned; still had slight pain in eyeball, but no discharge or sticking, and sight is perfectly normal.

This is eminently a disease of childhood and youth. The attacks are usually ushered in suddenly, with neuralgic pains headache, nausea and vomiting. Soon after, the paralysis of one or all branches of the motor oculi appears, when all the symptoms except the pain may cease. After a shorter or longer interval (a few days to a few months) it disappears for a time, to be followed after a few weeks', months', to a few years' interval by a recurrence. The attacks may be accompanied by photophobia, swelling of lids, catarrhal or purulent discharge, paralysis of the other eye muscles, and rarest of all, anæsthesia of any or all of the branches of the fifth cranial nerve, which appears on the same side as the pain and oculo-motor paralysis.

The pathology of this disease as given by Dr. P. C. Knapp is as follows: "The most tenable hypothesis is, that recurrent motor-oculi paralysis is due to some vascular change, inflammation, or œdema in a focal lesion, involving the root of the third nerve. As the œdema or exudation subsides, the conducting power of the nerve is wholly or partly restored and the paralysis disappears. In some cases the lesion may involve several nerves or the exudation may effect only a part of the lesion, involving different nerves at different times. As the lesion progresses, it may finally affect the nerve so far as wholly to destroy its conducting power, leading to permanent and total paralysis. The three reported autopsies confirm this hypothesis.

ŒDEMA OF THE OCULAR CONJUNCTIVA. By F. W. HIGGINS, M.D. (*Journal of the American Medical Association*, November 21, 1896).

One of the most constant symptoms of Bright's disease is œdema. Puffiness under the eyes is perhaps the symptom that the physician first looks for in a suspected case. That to which I wish to call attention is the much rarer condition of œdema of the ocular conjunctiva. Œdema may occur in any locality where there is cellular tissue, often without our being able to determine just why it is so especially marked in the location where we find it.

Some time ago I was called into the country to see a patient confined to the house by nephritis, exhibiting a peculiarly

marked case of ocular œdema or chemosis. The invalid was a married man, aged 22, a telegraph operator. Four years before, he had been suffocated by coal gas and remained unconscious for some hours; to this circumstance he ascribed his illness. He had been treated for albuminuria, in Michigan, for about two years, when he returned to New York State to place himself under the care of a professional relative, for whom I examined the eyes. I found the young man in bed, pale, with general anasarca, the urine loaded with albumen, and all the symptoms of a parenchymatous nephritis. He was totally blind, not, as you may suppose, from albuminuric retinitis, but from œdema of the ocular conjunctiva. This had first formed a chemosis, then had increased until the raised folds met over the cornea. These swellings were red, not having the pale, translucent appearance one might expect. In each eye they presented the aspect of a superior and inferior fold—like distended lids. The mucous membrane was dry and appeared thickened from constant contact with the air. The lids could not be closed. One would estimate that four drams of fluid was included in each eye.

The treatment was incisions, made, I must confess, too cautiously the first time, for my attention had never been called to a chemosis of any such extent, and I did not know what pathologic condition might be concealed beneath. The oozing of serum was slow, but sufficient to enable the cornea of one eye to be seen at my next visit. The incisions were repeated with the effect of enabling me at my third visit to examine the fundus, which I found almost filled with white patches of choroidal change, which we might call œdema of the choroid.

Now a peculiar complication occurred. The cornea was no longer completely covered by the folds, and still the œdematous and thickened conjunctiva prevented the lids from closing, which compelled me to give directions in regard to the cornea, to prevent damage from exposure.

I saw him no more, but learned that he had uræmic convulsions, after which sight and general symptoms improved, and he returned to Michigan. Here the conjunctivæ were treated by cautery, but the patient died about three months after I last saw him.

I am not able to give any reason why the ocular conjunc-

tiva should have become so infiltrated in this case. No iodide of potassium had been administered, or any other treatment that could induce it. There was no history of a previous affection of the eye. No discharge or symptoms of gonorrhœa.

Professor Schiess, writing in 1870, thinks the subject of conjunctival œdema has been neglected. He would ascribe all such cases as my own to preceding choroidal changes interfering with return circulation. I noticed that the retina could be seen with a plus glass in my case, but neglected to record the strength of it. According to Professor Schiess' view the pathology of my case would be that excessive infiltration of the retina and choroid first occurred, which caused passive congestion of the anterior portion of the eye, with exudation of serum and leucocytes. That there was a subacute inflammatory condition he would predicate from the dark red color of the mucous membrane and the thickening of the tissues. With this condition of the conjunctiva present, he would assume the presence of choroidal disease.

IRRITATIVE RETINITIS. By FRED. BAKER, M.D. (*Southern California Practitioner*, February, 1897).

Very soon after beginning ophthalmic practice in Southern California I was struck by the fact that we meet here a smaller percentage of grave ophthalmias and trachomatous diseases, including secondary involvement of the cornea, and a much larger percentage of eye-strain, and of those conditions which can in any degree be referable to the irritation of bright light. The following case is an extreme type of the latter condition: March 1, 1890, Lizzie M., came to my office with marked symptoms of asthenopia, headache on use of eyes being almost constantly present. Tests showed about 1.75 D. of hyperopia. Vision of each eye was $\frac{5}{v}$ —. The ophthalmoscope showed only slight choroidal and retinal congestion. I instilled atropine, found somewhat increased hyperopia, which I corrected with glasses. Twelve days later, she reported at my office free from headache, but vision of each eye had fallen to one-third of normal, and there was some photophobia which had not been present before. The choroid and nerves were nearly normal, but through the retina, mostly following the lines of the main vessels, and overlying them, were

hazy, blue-gray deposits suggesting spatter-work. I learned that my patient had absolutely disregarded my orders about shading the eyes, and I have no doubt that it was a case of retinitis due to irritation of the excess of light admitted to the retina by the dilated pupils. Treatment consisted in full doses of iodide, rest and protection of the eyes, continued for about six weeks, which brought vision to normal.

The process seems to be a sharp choroido-retinal congestion, then serous infiltration, and finally, organization of lymph into the localized patches, which become ultimately points of atrophy with connective tissue proliferation. In untreated cases, and those where vision is considerably impaired permanently, there are irregularities in the visual field. I have seen no case of marked scotoma; but by careful testing, spots of lessened clearness, with visual distortions, can often be demonstrated away from the line of most distinct vision.

The prognosis under treatment is generally good.

ALTERNATING CONVERGING SQUINT, OPERATED ON BY ADVANCEMENT OF THE EXTERNAL STRAIGHT MUSCLES; SUPPURATIVE TENONITIS; PERFORATION OF THE EYEBALL. By JOSEPH A. WHITE, A.M., M.D. (*Virginia Medical Semi-Monthly*, November 27, 1896).

Operations on the eye-muscles, whilst comparatively free from danger when properly done, are never altogether free from risk, even under strict antiseptic precautions, as may be shown by the case of the young lady now presented:

Miss L. C. T., came to see me March 6, 1896. The vision of the right eye was $\frac{20}{xxx}$, and the vision of the left eye was $\frac{20}{xl}$; H = + 1.25 R.; + 1.50 L., gave $\frac{20}{xx}$ and $\frac{20}{xxx}$. The deformity was so great that the eye that turned in invariably had one-half of the cornea concealed. I cut in turn both the internal recti, without much improvement in the deformity. I then advanced the external rectus of the right eye. Some weeks later (March 30), I advanced the external rectus of the left eye. These operations were done with the most approved antiseptic precautions, instruments thoroughly sterilized, and in both the operations the eye was flooded with a solution of bichloride of mercury, 1 to 2:000. In spite of this, the second

advancement was followed by a suppurative tenonitis. (This was interesting to me, because it was the only case I had ever seen, and its origin was obscure). The patient suffered much pain from time to time, and the eye discharged a great deal of pus, oozing out from under the tendon of the muscle, as if there was a pus cavity between the sclerotic and capsule of Tenon. The suppuration continued in spite of all treatment through the month of April, and it was late in May before perfect healing resulted.

On Tuesday, May 26, as the deformity was still very pronounced, although much improved, I decided to advance the same tendon that had suffered from the suppuration. I found no difficulty in picking up the muscle, and carefully separated it from the sclera; but as I uncovered the latter I observed that it seemed very thin, and at the lower part of the attachment of the muscle the moment the tendon separated from the eyeball I discovered that the sclera was entirely destroyed, and that the muscle was adherent to the uvea, which ruptured as soon as it was exposed, the vitreous protruding through the opening. The suppurative process had practically destroyed the tough fibrous sclerotic coat, leaving as the only support for the vitreous humor the uvea attached to the muscle. I at once passed a silk suture from without inwards through conjunctiva capsule, muscle, uvea, etc., and carried it through the conjunctiva as close as possible to the cornea, tying it firmly. She suffered considerable pain from time to time for four days after the operation, but no other unfavorable symptoms were manifested. I treated it as I would a cataract extraction with prolapse of the vitreous, and on the fourth day I found the eye doing well. On the sixth day I removed the stitch. The eye was then somewhat angry looking, with a slight apparent divergence; the cornea was clear; pupil freely acting, and vision for ordinary purposes fairly good. The ophthalmoscope showed faint cloud of vitreous with decided opacity in vicinity of the wound. On June 15 eyes were seemingly straight. There was slight hyperphoria and esophoria. Vision R. was $\frac{20}{xx}$, with + 1.5 D.; L., $\frac{20}{xxx}$, with + 1 D. $\odot$ + 0.75 D. c. ax. 90° . Opacity of vitreous was still marked in vicinity of wound.

PAMPHLETS.

"Granular Lids." By D. S. Reynolds, M.D.

"The Modern Treatment of Tuberculosis." By Paul Paquin, M.D.

"On Cyclone - Neuroses and Psychoses." By Ludwig Bremer, M.D.

THE NEW AMSTERDAM EYE AND EAR HOSPITAL.

The New Amsterdam Eye and Ear Hospital, which will complete its ninth year on May 1, 1897, now situated at 212 W. 38th Street, will move on that date to its new home at 230 W. 38th Street.

A special meeting of the Board of Trustees was held on Tuesday, February 7, to formally accept the new premises, Nos. 230 and 232 W. 38th Street, which had been purchased by the Executive Committee. The meeting was a very enthusiastic one; the action of the Committee was approved and confirmed by the Board, and the occasion was one of general congratulations. It is the intention of the management to begin at once to make extensive changes and alterations on the house No. 230 to make it in every way commodious and convenient for their purposes.

An extension of two stories will be built for a dispensary, several dark-rooms, an ample waiting-room and drug store, on the first floor, and on the other an operating room, room for examining refraction, and for the use of the optician. All of these improvements will be made in such a way as to secure to the medical staff a series of rooms in which to carry on their work, not to be surpassed in the city.

This Institution has rapidly grown in favor on the west side of the city, and as the eighth annual report shows, has also greatly increased in the numbers which apply for treatment. It is the intention of the Board of Trustees to open the new departments to public inspection as soon as they are completed which will be in the early fall.

AT THE FOURTH SESSION of the Congress of American Physicians and Surgeons at Washington, May 4-6, a discussion will take place on "The Gouty and Rheumatic Diathesis and Their Relation to Diseases of the Eye."

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

APRIL, 1897.

NO. 4.

ORIGINAL ARTICLES.

PAPILLOID GROWTH ON THE BULBAR
CONJUNCTIVA.

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PATIENT, Lillie P., a colored girl, of 10 years, presented herself at my clinic on February 3, 1897, on account of a red spot on the white of the left eye which, she stated, she had noticed for the first time about last Christmas. It was as large then, she thinks, as it is now. There is no history of trauma or inflammation of any kind, nor does the eye pain or inconvenience her in any way. Fig. 1 shows the position and appearance of the spot. It is roughly circular in shape, and measures about 1 cm. in its largest diameter. Two large conjunctival vessels enter its upper border and form a loop near its center and from this there radiate in a beautiful and symmetrical manner a large number of delicate vessels ending in loops at the edge or sometimes in a series of loops running back towards the center. The whole is easily movable with the conjunctiva over the sclera. The tissue between the vessels is slightly more opaque than the surrounding conjunctiva. There was no sharply defined edge and it was at first thought to be simply a formation of new vessels in the conjunctival tis-

sue probably from a blood-clot. In manipulating it, however, with a probe, it was found that it could be raised from the conjunctiva beneath, save at its attachment by a pedicle 2 mm. thick, where the large vessels entered it. As the smaller of these vessels, *a*, Fig. 1 filled from above, and the larger, *v*, filled below, when emptied by pressure, it was inferred that they were arteries and veins respectively. The growth is about 1.5 mm. thick at the center, gradually thinning off to a knife-like edge. It did not bleed on handling, and its surface is perfectly smooth.



FIG. 1.

It was watched for three weeks during which time there was no material change in its size. There were, however, some changes in its vascularization, some of the small vessels disappearing and new ones forming. The growth was clipped off close to its attachment to the conjunctiva and placed in 5 per cent. solution of formalin. There was an insignificant amount of bleeding.

Sections were made after proper preparation by Dr. Wallace Johnson at the Lionel Laboratory of the Emergency Hospital.

The histological structure is shown in Fig. 2. It is composed almost entirely of epithelial cells and blood-vessels, the connective tissue element being the scantiest possible. There is a pronounced tendency towards a definite arrangement of these cells, being squamous on the surface and passing gradually over to the columnar form at the center particularly where they join the connective tissue of the pedicle, *d*, Fig. 2.

From its histological structure the tumor falls more nearly in the category of papilloma than any other of the polypoid forms of neoplasm.

Granulation tumors are nearly always the results of traumatism or other destructive inflammation of the conjunctival tissue, and are composed largely of lymphoid cells.

True polypi, while having an epithelial covering, are constituted mainly of connective tissue, blood-vessels and lymphoid cells. Both these bleed easily on handling.

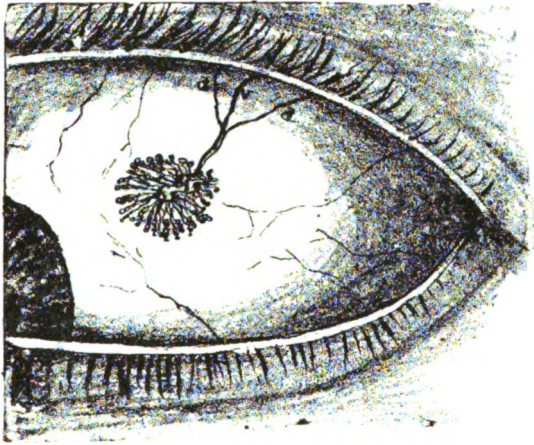


FIG. 2.

In papilloma, however, the epithelial element is predominant, and usually in the form of enlarged papillæ with a vessel running through the center of each and is commonly composed of a number of these massed together, of which the cauliflower condyloma is a typical example.

In the one now described there was no such division into separate papillæ, but it is perhaps not a far-fetched fancy to consider it as one in the process of formation and that these radiating vessels were the centers around some of which a single papilla would in time develop.

Growths similar in structure to this one have been found on the conjunctiva by Hirschberg,¹ Magnus,² Weeks³ and some

¹Centralbl. f. Augenheilk, 1884.

²Klin. Monatsbl. f. Augh, 1887

³New York Eye and Ear Infirmary Reports, January, 1896.

others, but they are rare and usually are situated on or near the curuncle. In some cases a suspicion of syphilis was present, and there were a number of the tumors scattered over the conjunctiva of the lids and ball. In some instances there has been a tendency to recur after removal.

ETHMOIDAL DISEASE. — ITS OPHTHALMOLOGICAL SYMPTOMS.¹

BY THOS. R. POOLEY, M.D., NEW YORK.

THE purpose of this paper is to portray the symptoms of the diseases of the ethmoidal cells which present themselves to the ophthalmologist, and to briefly consider the proper treatment therefor.

For a better comprehension of the subject, it will be well to give an outline of the anatomy of the inner walls of the orbit, and of their relation to the ethmoid cells and other accessory sinuses.

The inner wall of the orbit is vertical, joins the roof above at almost a right angle, while below, it passes, by a gradual curve, into the floor.

It is made chiefly by the orbital plate of the ethmoid, os planum, a small part of the sphenoid is behind this. In front of it is the lachrymal bone, which consists of two parts. The hind one is in the same plane as the ethmoid. The front one, separated from the other by a ridge, forms a part of the lachrymal groove, which is completed by the ascending process of the superior maxillary.

The anterior and posterior ethmoidal foramina are between the ethmoid and the frontal, and open on the inner wall of the orbit. Almost the whole of this wall is of extreme thinness; and quite unable to resist pressure as of a tumor, from either within or without.

Anteriorly, the frontal sinus descends into it. Below and behind this, the wall separates the orbit from the nasal cavities.

¹Read before the Section of Ophthalmology of the Academy of Medicine, March 16, 1897.

Occasionally, the ethmoidal plate bulges into the orbit. Probably this, if marked, is pathological.

The floor slopes more or less downward and outward. It is made by the superior maxilla, excepting a small triangular piece near the apex made by the palatal, and its outer anterior angle, made by the malar.

The sphenomaxillary fissure opening into the zygomatic fossa bounds the floor externally in the posterior two-thirds of its extent. From this fissure the infra-orbital groove runs to within 1 or $1\frac{1}{2}$ cm. of the anterior wall, when it becomes a canal passing under the infra-orbital ridge. Very often, its course is marked by a suture in the floor.

From the inferior part of each lateral mass of the ethmoidal cells, just beneath the os planum projects the unciform process. It serves to close in the upper part of the orifice of antrum, and articulates with the ethmoidal process of the inferior turbinated bone.

The posterior ethmoidal cells open into the superior meatus of the nose, just beneath and in front of the superior turbinated bone, by means of an orifice at the upper part of this fissure.

It is by a large orifice at the upper and front part of the middle meatus that the anterior ethmoidal cells, and through them the frontal sinuses, communicate with the nose, by means of a funnel-shaped canal, the infundibulum.

It will be thus seen that the cellular cavities of each lateral mass thus walled in by the os planum on the outer side, and by the other bones already mentioned, are divided into two sets, which do not communicate with each other. They are termed the anterior and posterior ethmoidal cells or sinuses.

The former, more numerous, communicate with the frontal sinuses above, and the middle nasal meatus below by means of a long flexuous canal, the infundibulum and occasionally by an opening in the median side of the bulba ethmoidalis. The posterior, less numerous, open in the superior nasal meatus, and communicate (occasionally) with the sphenoid.

Diseases of the ethmoidal and sphenoidal sinuses are the most unusual of those affecting the accessory sinuses, according to Fuchs among the greatest rarities, and besides, are, for the most part, not possible to diagnose in the living. To

both of these statements we may take exception. The diseases are not so exceedingly rare, and they can be diagnosed with reasonable certainty during life.

The dilation of these cavities takes place through a bulging out of the walls. Moreover, the wall of these cavities which looks toward the orbit is bulged outwards so that exophthalmos with a coincident lateral displacement of the eyeball toward the side opposite to that of the ectasis occurs.

The most frequent cause of such distension of these cavities is in the accumulation of secretions in them. They are accessory cavities of the nose and are lined by extension of the nasal mucous membrane.

Catarrhal inflammation of the nasal mucous membrane is frequently communicated to them, and, if the passage, narrow as it frequently is, between the accessory sinus and the nose is blocked by swelling of the mucous membrane, secretion is accumulated in the former.

As the mucous membrane of the accessory cavity does not stop secreting, it gradually becomes filled, and finally, distended with secretion.

This secretion may have a varying consistency, being of watery, glairy, sticky or purulent character. In other instances, the distension may be produced by tumors, such as polypi, osteomata or malignant new-growths.

Having thus briefly referred to the symptoms referable to all of the accessory sinuses, let us now enter more at length to the special subject of our paper. The commonest form of the disease of the ethmoidal cells is that caused by the retention of secretion in them, and which we prefer to call, after Knapp, retention cyst, the symptoms of which may be thus summarized: A tumor develops slowly, accompanied by but little pain or inconvenience in the upper inner angle of the orbit, which pushes in the inner wall; may slightly displace the eye downward and outward and is located above and behind the ligamentum canthi internum. Its entire surface is hard and somewhat nodular and the whole tumor immovable. Indeed the fact to be most remarked upon and emphasized is that by the symptoms alone afforded from the history, growth or palpation of the tumor, it is difficult if not impossible, to differentiate it from an exostosis. The exploration by incision alone will definitely decide this point. Or it may be arrived

at by penetrating the tumor with a trocar. This being done, we enter a cavity from which secretion escapes. The nature of this secretion is neither of a water nor purulent character, as is usually stated, but has a thicker consistency, is of a glairy, sticky and tenacious kind, resembling honey.

A remarkable case of this kind, with some unusual features, came under my notice recently. A healthy young girl, 12 years of age, consulted me at my clinic October 2, 1896, and she is present here this evening for you to see.

Situated in the upper inner region of the right orbit, reaching downward below the ligamentum canthi internum, was a reddened area of swollen indurated tissue, and, just above the ligamentum canthi, was a fistulous opening, from which a muco-purulent discharge escaped, and which, according to the patient and her mother's statements, had existed in that state for a considerable time.

It came first as a hard swelling, and, subsequently, the discharge occurred, but, at no time, was there any considerable pain or disturbance of the functions of the eye. The disfigurement from constant discharge caused her to seek relief. At first, I did not connect the difficulty with the ethmoidal cells, but took it to be an abscess with fistulous opening, and tried to close it by cauterization, which proved unsuccessful. I then (December 15, 1896), etherized the patient, slit the sinus open, turned out a mass of granulation tissue, and packed it with iodoform gauze. After a few days of this treatment, a point could be seen by illumination with a laryngoscopic mirror just above the ligamentum canthi internum from which the discharge seemed to come. A strong lachrymal probe placed at this point, pierced the bone and entered into a cavity from which a quantity of stringy muco-purulent matter escaped. On more careful examination, this proved to be an irregular, but uninterrupted bony cavity, containing mucus of a stringy character. The bone was farther broken down with the probe, the cavity washed out with carbolyzed warm water, but none of the fluid seemed to find its way into the nose. Dr. Myles made an examination of the nose, but found only a slight swelling of the middle turbinated bone. The function of the nostril did not seem impaired, nor was the voice affected. I now inserted a small, soft, silver style, perforated along its sides, which was removed daily and the cavity syringed out with

carbolized water. The discharge gradually became less, of a more mucous character. That granulation from the bottom was taking place became evident from the tendency of the tube to be extruded. In three weeks I removed the style, and in one week more the wound had firmly closed and there has been no relapse.² For some time, the tissues remained hard and swollen, but this, as you will see, has disappeared. I showed the patient to the Section while she was wearing the tube.

The feature of unusual interest in this very interesting case is, that instead of the bony tumor at the usual site, there was a fistula, caused by the spontaneous opening of the tumor in its least resistant part; but, on account of the imperfect emptying of the cyst, did not cause a cure. It was, therefore, necessary to come to the aid of Nature. The short time required for the cure is of interest. In one case reported by Knapp, it took one year to close the cavity, during all of which time the patient wore a style. I do not think that a large opening into, or removal of, all of the bony wall which protrudes into the orbit, recommended by Knapp, is either necessary or desirable, although it may not, in any way, interfere with the preservation of the eyeball. An opening sufficiently large to admit of free drainage—perhaps this might be better accomplished by making communication with the nose, cleansing of the cavity by aseptic solutions, and, if this does not arrest the morbid secretion, injection of irritants is all that is needed. This is shown in the short time required to cure the case reported. More destruction by chiselling away the bony wall would, of necessity, have made the healing more protracted, and might result, too, in a sinking in of the inner orbital wall. In some of these cases, besides the contents spoken of, we find granulations, or polypoid growths filling the cells, which must be removed by a sharp spoon.

Exostosis may develop from the ethmoidal cells, as well from the frontal sinus, and, from thence, protrude into the orbit, or they may have prolongations from both of these cavities.

I show here, this evening, such a growth which I successfully removed, with preservation of the eye, February 8, 1890,

²Since this was written there is a slight relapse in the way of a small opening from which some muco-pus exudes.

which probably had its origin in the ethmoidal cells. This, while stated at the time of publication (*Medical Record*, October 11, 1890), was rendered still more so by the subsequent discharge through the nose of a sequestrum (which is, too, shown), after a violent attack of sneezing.

These growths show themselves as ivory, hard immovable tumors in the upper inner angle displacing the eye, impairing its movements, producing exophthalmos, attacks of cerebral irritation and optic neuritis.

It will be, as a matter of fact, often difficult to be sure before the facts are brought to light by the operation for their removal, whether they have their origin in the ethmoid or frontal sinus. These growths are rare. My experience embraces two cases. Both operated on. One died, the other recovered. They should be operated on, if the symptoms are formidable enough to warrant it, by detaching them from their basis with a chisel, or, better still, by enucleation, which means detaching them from the periosteum which covers them, and prying them out of the cavity from which they grow.

Time does not permit me to go into the details of the operation. Successful cases have been published by Knapp, Andrews, Reeves, myself and others; and Andrews has entered very fully into the literature of the subject in a most admirable paper in the *Medical Record* of September 3, 1887.

I may mention, in conclusion, that other growths than osteomata may start from the cavity of the ethmoidal cells and protrude into the orbit. Their anatomical structures being very various. Among them have been classified fibrous, myxomatous, polypoid (although, as has been pointed out already, polypi, in the present writer's opinion, are the outcome of granulation tissue, resulting from retention cysts), sarcomatous, cartilaginous, osseous (already mentioned), adenoid and carcinomatous tumors.

The maxillary antrum, however, is more frequently invaded by such growths than any other of the accessory sinuses. It is, perhaps, unnecessary to point out the indications that such growths have developed from the ethmoidal sinus. It is to be inferred from what has gone before. The prominence of the globe, displacement thereof in a direction away from the growth, cerebral irritation, perhaps optic neuritis co-

incident with the finding of a growth in the upper wall of the orbit.

It must be borne in mind that the tumor, although developing in the nose or maxillary antrum, may, from thence, invade the ethmoid cells, by destroying in its growth the inner and lower walls of the orbit.

In concluding these desultory remarks I may say that no attempt has been made to enter into the consideration of the diagnosis of diseases of these cells, especially of those of retention cysts, by the examination of the nose and post-pharynx, which is a subject of much interest, and there are those present whose knowledge in this particular would make any remarks they might offer of more interest than anything I could say.

A NEW LAMP FOR SKIASCOPY.

BY B. E. FRYER, M.D., KANSAS CITY, MO.

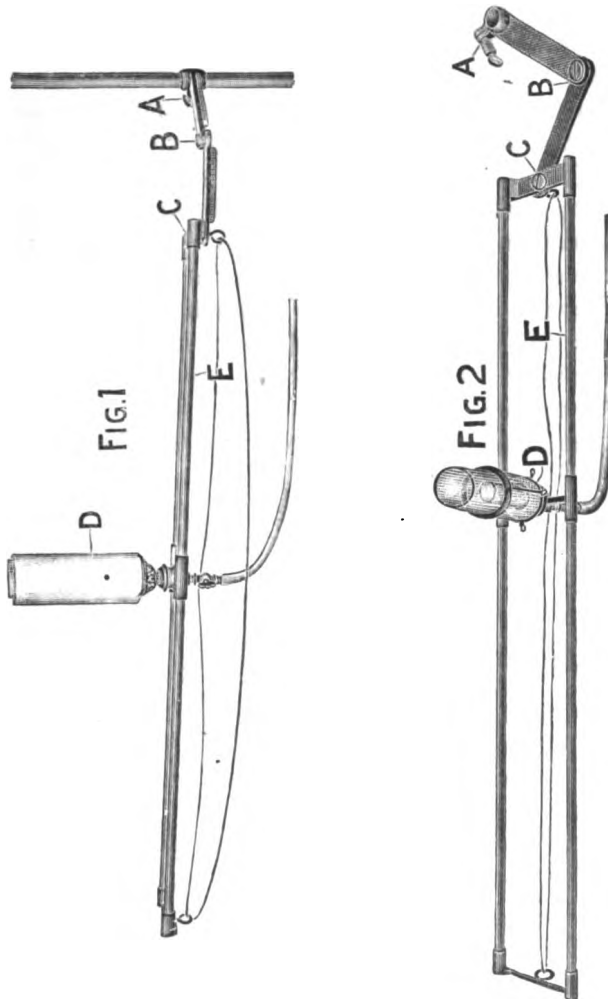
THE skiascopic test for refractive errors is growing in favor; in fact, probably a majority of the most careful oculists apply it as a routine matter in their refractive work. As is well known, by this method we can very quickly and easily arrive at the exact refraction of an eye, which other measures may not give as readily or as correctly.

As Dr. Edward Jackson has shown in his thorough monograph on "Skiascopy," it is of that great advantage in the practice of the method, to have a light which can be "pushed off" from, or brought near to, the observer. This, of course, is mainly important when using the plane mirror, which latter under most conditions, is the more generally useful and satisfactory.

I have had a lamp constructed which I find very convenient for the purpose, and the two accompanying figures are an illustration of it. Fig. 1 gives a side view, and Fig. 2 a bird's eye view. The letters in each figure correspond.

A is a vertical rod, three feet long, attached to the wall of the room by a cross-piece above and below arranged however far enough from the wall so that the whole apparatus can be raised or lowered to any height desired, and clamped and fastened by a thumb-screw as indicated at A in Fig. 2. There is

a joint at B, which allows of the lamp being moved laterally, and one at C, which also allows of lateral movement. At A, the lamp proper is shown in position, held by a cross-piece connecting a pair of rings or rather short tubes which allow



the lamp proper to slide, when desired, smoothly over the long bars which form the long sides of the parallelogram (Fig. 2). The long diameter of this parallelogram is a little over one metre. Attached to the short sides, but below them, is a ring through which a cord, E, plays for the purpose of draw-

ing the burner towards, or pulling it away, from the observer's eye. A rubber tubing connects the burner with a gas pipe near. The light I use is furnished with a Wellsbach burner, and in Fig. 1 this is shown with an asbestos hood, in which latter is a small perforation. Of course, the ordinary Argand burner can be used instead of the Wellsbach. The whole lamp can be swung back against the wall out of the way when not in use.

It will be found that the observer, in making a test, can, without removing the mirror from his eye, change the distance between him and the light very conveniently and readily, and that in doing so the light moves practically along as a right line. With the plane mirror, by "pushing off" the light its full distance (one metre), the observer being at one metre from the observed eye, has practically the immediate source of light at two metres, and can thus do away with the observer moving from the patient that distance; or can readily have the burner at any point along its range.

The lamp can be obtained from Mr. G. B. Lichtenberg, 1210 Main Street, Kansas City.

ACUTE GLAUCOMA ASSOCIATED WITH LARGE NASAL POLYPUS. REMOVAL OF THE POLYPUS AND RELIEF OF THE GLAUCOMATOUS SYMPTOMS.

BY S. C. ARYES, M.D., CINCINNATI, OHIO.

PATIENT, Mr. M., aged 55, in fairly good health, applied for advice in relation to the vision of his right eye, which had recently become quite dim. There had been attacks of dimness recently but they had subsided, but as these attacks had become more frequent he became alarmed. He had always enjoyed excellent vision and was wearing the ordinary convex glasses suited to his age. Vision in the right eye was 0.2. The pupil was moderately dilated but responded sluggishly to light. Tension was + 1 ?; tension of the left eye was normal. The ophthalmoscope revealed no cupping. The nasal twang about his voice induced me to examine his nose

and I found in the right side a very large and solid mucous polypus which quite filled its lumen. It was quite impossible for him to breathe through this side. He said this state of affairs had existed for a long time, but as he could breathe through the other side he had paid little or no attention to it.

Eserine was ordered for the right eye and the next day, February 24, 1891, vision was reduced to 0.1. Tension same as yesterday. February 26, eserine has been used for the past two days and $V.=0.3$. There is no turbidity of the media. Removal of the nasal polypus was urged on the grounds that it was necessary for healthy respiration and that there might be some indirect connection between the glaucoma and the pressure in the nasal cavity. This was done at once and the next day the eye was decidedly improved. Vision was 0.7, and tension was normal. February 28, $V.=0.8$. The glaucomatous symptoms seemed to disappear as soon as the polypus was removed and his eye promptly regained normal vision.

Two or three years later he was a client of mine for conjunctivitis, but there was no return of the increased tension or of the spells of dimness which he had prior to the operation. Was this a reflex irritation?

A CASE OF SCIRRHOTIC CARCINOMA OF THE ORBITAL LACHRYMAL GLAND.¹

BY J. ELLIS JENNINGS, M.D., ST. LOUIS, MO.

WITH MICROSCOPICAL EXAMINATION.

BY ADOLF ALT, M.D., ST. LOUIS, MO.

PATIENT, Mrs. C., aged 45 years, came to the Mullanphy Hospital February 1, 1897, on account of the prominence and displacement of her right eye. She was first seen by Dr. N. B. Carson at the Surgical Clinic, but the following

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

day appeared at the Eye Clinic and came under the care of Dr. S. Pollak and myself.

The patient is a large, healthy-looking woman weighing 180 pounds. Family history negative. Her father and mother died in the old country, cause of death unknown. One sister died in 1893 from kidney disease. Has one grown daughter in good health.



FIG. 1.

Patient states that she first noticed that the right eye was more prominent than the left in 1885, about twelve years ago. This proptosis increased very slowly and never caused her any pain or inconvenience other than cosmetically. In 1887, she applied to the Missouri Medical Eye Clinic for treatment, but as they advised an operation she did not go back.

October 29, 1893, she again sought advice, this time at the Beaumont Hospital Eye Clinic, where she was seen by Dr. Alt. From the notes of the case, taken at that time, a large intra-orbital tumor was found apparently springing from the roof of the orbit. A diagnosis of osteo-chondroma (?) was made and an operation advised, but as she was suffering no pain, this was refused.

Early in August, 1896, the patient noticed that the bulging of the eye was rapidly increasing, and for the first time began to suffer from a burning pain in the eye with severe

headache and neuralgia confined to the right side of the head. After suffering in this way for six months she decided to have an operation performed.

PRESENT CONDITION.—The drawing gives an accurate idea of the condition. The right eye is seen to be pushed very far forwards and somewhat downwards. When the eye is kept open naturally the upper lid is 2 or 3 mm. behind the upper margin of the cornea. As the eye is sensitive to light, the patient keeps the eye partially covered by drawing down the upper lid with her fingers. The palpebral and ocular conjunctiva are hyperæmic. The ocular movements are good. The pupils are equal in size and active to light. Above the eyeball a hard tumor is felt apparently occupying the upper portion of the orbital cavity and extending outward over the orbital margin. V., O. D. $\frac{2}{LX}$; O. S. $\frac{5}{V}$.

The optic disc of the right eye is of a dull gray color and is surrounded by a very large patch of choroidal atrophy with pigment changes in the macula region. The veins and arteries are quite small.

The tumor was removed by Dr. Carson February 4. An incision 5 c.m. in length was made over the upper orbital margin and the tumor in its capsule was easily dissected loose. The only point of attachment was at the outer edge of the orbit. The wound was closed with buried gut sutures, an antiseptic dressing applied and the eye bandaged for one week. When the dressing was removed the wound had healed and the eyeball occupied its normal position in the orbit.

The patient has kindly consented to be present this evening and if you examine her you will notice that there is now—one month after the operation—considerable ptosis and proptosis. The ptosis is gradually becoming less marked and may disappear in from six months to a year. The return of the proptosis at so short a time after the operation must be due to cicatricial contraction and not, I take it, as an indication of a recurrence of the growth. The special point of interest in this case, *i. e.*, the slow growth of the tumor, is explained by the scirrhus nature of the carcinoma.

MICROSCOPICAL EXAMINATION OF THE ORBITAL TUMOR.

The tumor when handed to me for examination was a little more than one and one-half inches long and one inch thick,

of an ovoid shape and apparently surrounded by a dense capsule.

It consisted histologically in the main of connective tissue and epithelial cylinders. In some parts the latter prevailed, while in other large areas a dense connective tissue only was found. In the tumor proper no blood-vessels could be detected.

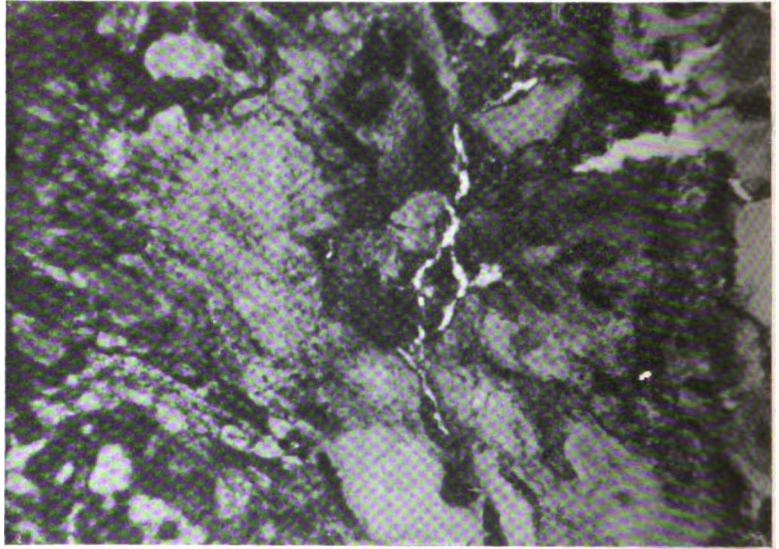


FIG. 2.

The epithelial cylinders were arranged as we are accustomed to find them in carcinomatous tumors. They consisted of cells with a peculiarly large oval nucleus. They were evidently dropsical and undergoing a regressive metamorphosis in places, while in others karyokinetic figures and in some two and three nuclei showed further new-growth of cells.

As, when seeing the case three years ago, I had found an enormously large intra-orbital tumor apparently springing from the roof of the orbit and causing a straight-forward exophthalmus, which was immovable and therefore led me to the diagnosis of an osteo-chondroma, I was particularly desirous to find the starting point of the tumor. I think I found it in the lachrymal gland.

To one end of the tumor portions of a glandular organ were firmly adhering, which I am satisfied from their structure, were remnants of the lachrymal gland.

The connective septa had disappeared and the acinous arrangement was hardly recognizable, but the cell cylinders still showed a regular arrangement. From this more solid epithelial structure the epithelial cell cylinders were seen to break through a connective tissue capsule, evidently the capsule of the lachrymal gland, and to spread out into the tumor.

In what I consider to be the remnant of the lachrymal gland a peculiar appearance was caused by the presence of innumerable granules lying between and within the epithelial cells and which from their shape are evidently the nuclei of leucocytes undergoing disintegration. Perhaps this is a sample of what Mentschnikoff described as phagocytosis and we have to look upon these leucocytes which are partly eaten up by the epithelial cells, as the vanquished army which for a long time has kept the enemy from advancing.

Another cause for the slow growth of the tumor, though undeniably a carcinoma, lies in the considerable connective tissue formation.

I consider the tumor to be a scirrhotic carcinoma starting from the lachrymal gland.

DISCUSSION.

DR. ALT.—The most interesting point in this case is the long period of duration of this growth—twelve years. This is the case of which I showed some photographs on the screen last night. I think the scirrhotic character of the growth is the explanation of its slow development.

RIGHT OF BLIND PERSON TO TRAVEL ALONE.—A question on which there seems to be a scarcity of decisions is whether a person otherwise qualified may be rejected as a passenger for the sole reason that he is blind. It was litigated in the case of *Zackery vs. Mobile and Ohio R. R. Co.*, where the Supreme Court of Mississippi decided, February 1, 1897, in the blind man's favor, the one in question being admittedly not infirm, but robust, able to take care of himself, and to comply with the rules applying to passengers generally.—*Journal of the American Medical Association.*

HÆMORRHAGIC GLAUCOMA.¹

BY ADOLF ALT, M.D., ST. LOUIS, MO.

ON SEPTEMBER 11, 1895, Mrs. G., aged 64 years, consulted me with the statement, that three weeks previously she had noticed that vision in her right eye became dim. This dimness had since gradually increased and that eye was practically blind.

The patient was a frail, badly-nourished woman, but considered herself otherwise perfectly healthy.

I found vision in the affected eye reduced to bare perception of light, in the left eye $\frac{20}{\infty}$; 3 D. of hypermetropia. The anterior chamber was very shallow, the media were clear

In the right eye the macular region was the seat of a large retinal hæmorrhage, in which a number of whitish spots were visible. This hæmorrhage had comparatively regular outlines and was about twice as large as the papilla optica. Some smaller hæmorrhages lay between the macula and the optic papilla and on the other side of the latter and some small point-shaped hæmorrhages were situated farther out from the macula towards the ciliary region. The larger blood-vessels were only visible in parts; they appeared peculiarly dark and tortuous, the arteries without light-streaks and the veins were but slightly broader than the arteries. Tension was normal.

The pulse was normal, yet on examining the urine, I thought it contained a trace of albumen. Histologically, it contained nothing abnormal. I ordered milk diet and iodide of sodium. I also sent the patient at once to my friend, Dr. Baumgarten, of this city, whom I have long known as a very careful observer. His report, after repeated examinations, however, was that he could find nothing abnormal concerning the more important organs, neither did he find any albumen in the urine.

Under the treatment I had instituted her vision gradually became somewhat better until on October 4 it was $\frac{5}{\infty}$. At

¹Read and illustrated by lantern slides at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

the same time the large hæmorrhage in the macular region underwent in parts a fatty degeneration and was partly absorbed.

On October 8 she came complaining of severe pain which had suddenly come on during the night. There were now a number of engorged episcleral veins. Tension was perhaps somewhat increased and there was a posterior synechia. Some new hæmorrhages had appeared in the retina and vision was again reduced to light perception. I ordered eserine and cocaine and prepared her for the evident coming on of glaucoma. A week after, on October 14, glaucoma was fully developed and eserine had no effect on its course. On October 16, the eye was totally blind, the lower half of the anterior chamber was filled with blood and no view of the fundus could be obtained. The pain meanwhile had become excruciating. The eyeball was now of a stony hardness and as miotics had no effect and I was satisfied that surgical interference would make matters only worse, I proposed enucleation. To this she consented on October 23.

This, then, was a typical case of retinal hæmorrhages inducing secondary glaucoma and it had run its course in about eight weeks, if the patient's statement can be considered as correct.

Her other eye has never shown any pathological symptoms up to this day.

The eyeball was hardened in formol solution. When I opened it a few days later, the vitreous was found to contain blood, especially in its outer portions and near the macula lutea. Contrary to the statements made, that in these cases the hæmorrhages are confined to the posterior pole of the eye, the retina to the very *ora serrata* was sprinkled with smaller and larger hæmorrhages of various shapes and sizes. The greatest effusion of blood, however, had evidently taken place in the macular region and between it and the optic papilla.

On histological examination I found the following: The cornea and Descemet's endothelium in general appeared unaltered. The periphery of Descemet's membrane was studded with glass warts. Schlemm's canal in all sections was closed, the compressed tissue of the ligamentum pectinatum filled with pigment molecules.

The periphery of the iris was closely attached to this tis-

sue and closely applied to Descemet's membrane farther forward. In the lower parts of the eyeball, where the blood had been, a delicate newly-formed membrane stretched from the insertion of the iris on Descemet's membrane over the anterior iris surface half way to the pupillary edge. This newly-formed tissue which I consider to be a direct consequence of the presence of blood in the anterior chamber, had in this case no time to lead to ectropium of the uvea, as we see in cases of longer standing.

The iris tissue throughout appeared atrophic, its blood-vessels were empty, their walls thickened. Where the sphincter edge touched the anterior lens capsule it was adherent to this.

The ciliary body and crystalline lens were pushed forward together with the iris. In consequence, the angle between the posterior surface of the iris-root and the apices of the ciliary processes was in most sections totally or almost totally obliterated and some ciliary processes lay in front of the periphery of the lens. The fibres of the zonule of Zinn were evidently stretched and ran forward in straight lines instead of being gently curved as in the norm.

The ciliary body was atrophic throughout. Its muscular tissue showed the arrangement of æquatorial fibres characteristic of short eyes. Its blood-vessels, where found, were gorged with blood, their walls frequently thickened.

The uveal and retinal cells of the ciliary body appeared considerably altered in a large number of sections, in that the cells appeared irregular and vesicle-like in shape and their nuclei did not stain well. In bleached sections it was seen that, as I have found in a number of glaucomatous eyes, both the pigment epithelium and the retinal layer cells were dropsical and appeared as large vesicle-like bodies.

The crystalline lens differed from the norm in so far only that its anterior surface was considerably more convex than its posterior one.

The anterior portion of the eyeball, thus showed all the histological symptoms which we are accustomed to look for in the present stage of our knowledge of the disease called glaucoma. To this I should add that the periphery of the retina was to a considerable extent altered and presented the condition which since Iwanoff is termed cystoid degenera-

tion of the retina, and which perhaps is, also, due to former hæmorrhages.

The posterior part of the eyeball was especially interesting on account of the hæmorrhages into the retina and the changes they had produced.

The optic nerve showed but a slight infiltration with round cells. The optic papilla was but slightly excavated and this excavation was a little deeper (Fig. 1) on the inner side of the papilla.

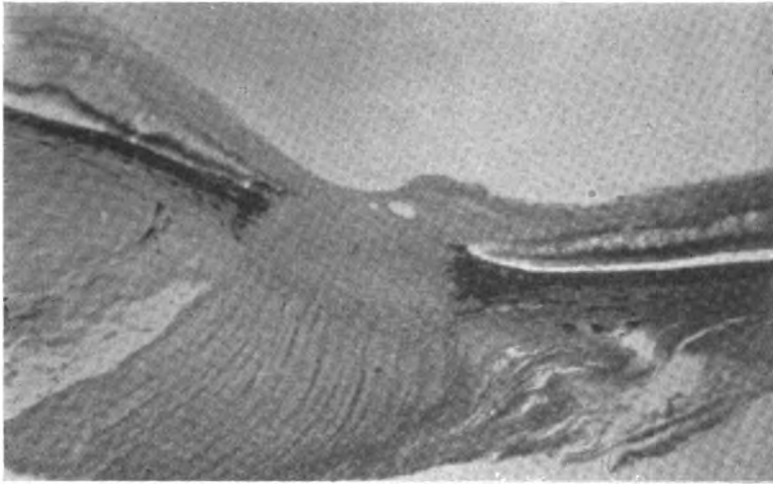


FIG. 1.

While hæmorrhages of quite recent and many of older date were found to occupy the nerve fibre, ganglionic, inner molecular and granular layers throughout the retina, the most conspicuous changes were found in the macular region and on both sides of the papilla. Heré the most striking appearance was that the retina was considerably thicker than normal and was filled with innumerable cavities varying in size and shape. These cavities were partly empty, partly filled with finest fibrinous threads and few degenerated and fat granule cells, partly with blood cells alone. They were separated from each other by the supporting tissue of the retina pressed aside and together, so as to form more or less regular columns. These cavities reached from the nerve fibre layer outward to the

outer granular layer, the parallel outlines of which were in places deranged. What was left of the nerve fibre layer was almost all over gorged with blood (Fig. 2). In some places smaller, and in one place a considerable rupture of the retina had taken place. In the several sections I have of this latter, it is seen to have originated from two ruptures which finally united into one. One of these was on the inner surface and through it the blood entered directly into the vitreous body, the other was outward through the outer granular and the bacillary layer and produced a circumscribed hæmorrhagic detachment. The rods and cones were greatly changed in shape, in places wanting.

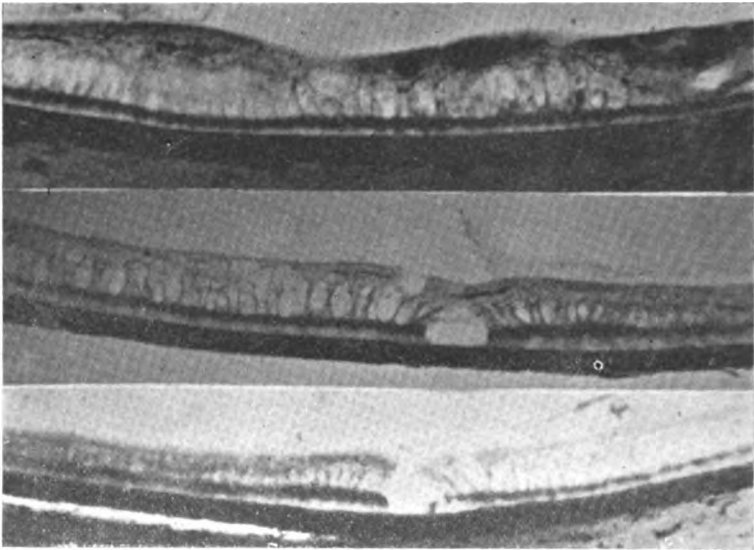


FIG. 2.

Our interest in such a case centers particularly around the blood-vessels of the retina. Wherever there was a larger hæmorrhage two pathological conditions were found, namely, thrombosis and thrombo-phlebitis of the larger venous blood-vessels and a very remarkable pigment degeneration of the walls of the smaller blood-vessels. Whole areas of the latter were changed into pigment granules which lay free in part and in part were inclosed in cells. In their neighborhood leucocytes abounded which had taken up the pigment granules (Fig. 3) and were carrying them away.

This pigment degeneration is a condition, I have never seen before, nor have I been able to find its description anywhere. It corresponds most with the pigment atrophy of muscular tissue. The arteries showed frequently, but not far progressed, an endo-arteritis.

The choroidal blood-vessels were hyperæmic, but the tissue of this membrane was not strikingly altered. I want to state, however, that under the action of formol it had shrunk considerably.

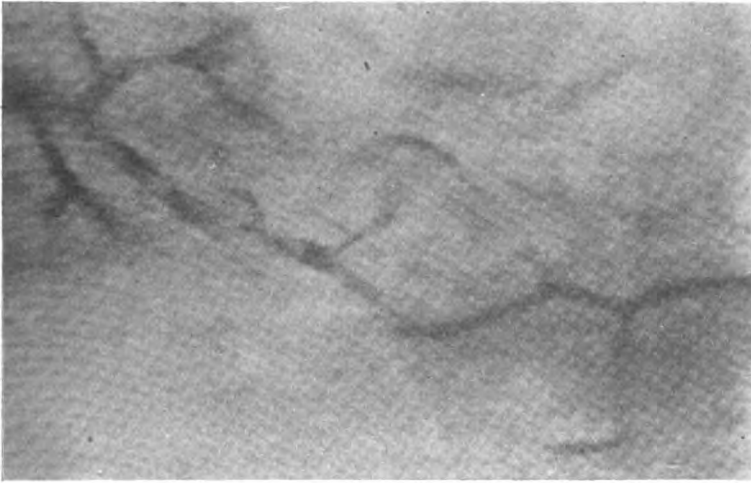


FIG. 3.

When considering the clinical history of the case together with the histological conditions, as found, we may then assume the following to have been the course of the disease: In a hypermetropic eye with a shallow anterior chamber an unknown cause led to thrombosis and thrombo-phlebitis of numerous larger retinal veins; this resulted in stasis and multiple larger and smaller hæmorrhages into the retinal tissue and to pigment atrophy of large areas of smaller blood-vessels from malnutrition. More and more hæmorrhages took place while the older ones underwent fatty degeneration and became partially or totally absorbed, and finally led to several smaller and to a large rupture through the whole thickness of the retina with a considerable effusion of blood into the vitreous body. The blood

being carried by the normal route of the fluids within the eye, through the pupil into the anterior chamber, perhaps, caused the iritis; it also led to a newformation of tissue on the anterior surface of the lower half of the iris, with which the blood remained longest in contact, but it certainly caused the plugging of the filtration tissue in the iris angle. In this manner the intra-ocular pressure became increased and the vicious circle was established leading to the atrophy of the ciliary processes, the pressing forward of the iris periphery and its adhesion to the corneo-scleral tissue, by which in turn a further increase of intra-ocular pressure must necessarily have resulted.

From the conditions found in this case a *restitutio ad integrum* was never to be expected and surgical interference other than enucleation had nothing to hope.

In general, then, our case is very similar to quite a large number as thus far described by others. The fact that retinal hæmorrhages under favorable conditions may secondarily produce glaucoma is and can no longer be doubted. I shall not weary you with a list of the literature, as authors having reported similar cases I will only mention Pagenstecher, Wagemann, Deutschmann, Weinbaum, Würdemann, De Schweinitz, Schweigger and Lüderitz.

The changes usually found by these authors in the blood-vessels were either confined to endo-arteritis of the retinal arteries with partial or complete closure, or thrombosis and thrombo-phlebitis of the central vein, or, as in our case, multiple thrombosis of the larger retinal veins.

Such and similar pathological changes in the retinal blood-vessels are often seen, retinal hæmorrhages—and even very large ones—are very often observed and yet no glaucomatous symptoms are evoked by them. We see large hæmorrhages into the retinal tissue and into the vitreous being absorbed without causing glaucoma, while in other cases, as seems to be pretty certain, such hæmorrhages are followed by connective tissue formation in the vitreous body (the retinitis proliferans of Manz). Why, then, do such retinal hæmorrhages in some cases produce hæmorrhagic glaucoma? This question naturally arises when considering such cases. Is there anything specific in the hæmorrhage? Certainly not. As far as we know the hæmorrhages as such do not differ from others.

The cause then can only lie in a peculiar previous condition of such eyes when attacked by retinal hæmorrhages.

In my case the hæmorrhages took place in a hypermetropic eye with a shallow anterior chamber. From many specimens examined by me I know it to be a fact and I have, years ago, published it, that in short eyes the insertion of the iris on the anterior part of the ciliary body is much nearer to the ligamentum pectinatum, than it is in long eyes. In consequence the iris angle is much smaller and the anterior chamber more shallow in the short eyes; an obliteration of the iris angle by pressure from behind which forces the iris periphery forward and outward and brings it into contact with the spongy tissue on the inner surface of the cornea, is therefore much more easily brought about in such eyes.

The primary factor, however, I think is always a plugging of the filtration channels, in the cases under consideration due to blood cells which by diapedesis or in consequence of ruptures (by rhexis) are carried into the vitreous and then into the anterior chamber.

True, in some cases we see large hæmorrhages, sometimes even such as fill the whole anterior chamber, gradually disappear without arousing any glaucomatous symptoms. We can only say, that in such cases the channels of filtration were wide enough to take care of the surplus material.

When, however, the filtration channels in the iris-angle are comparatively narrow, when the iris-angle and the anterior chamber are shallow, the surplus matter, and blood-cells more especially, will be caught in the narrow meshes of the filtration tissue, which leads to the clogging of its channels. If this condition lasts long enough, it must start the vicious circle of glaucomatous symptoms. If the hæmorrhages are due to degenerated blood-vessels and in consequence new and repeated hæmorrhages follow the first ones the symptoms must naturally grow graver and graver—till the hope of saving any vision is gone.

DISCUSSION.

DR. TIFFANY.—For one I must thank Dr. Alt for his excellent paper and the fine illustrations. The Doctor spoke of the special pathology of these cases. It seems to me, as he hinted, that the great amount of serum in the globe filling the

vitreous chamber and passing through and interfering with the exit of the fluid brought about this increased tension. It occurred to me, when he was reading the paper, that this case was one of hæmorrhagic retinitis, rather than that it was a true glaucoma. That there were glaucomatous symptoms, but as the Doctor mentions that the eye was hypermetropic two or three dioptries, that would help to account for the increased ocular tension on account of the occlusion and retention of the fluid. While I am on my feet I would like to ask Dr. Alt and the other gentlemen, if it has come to their minds that acute glaucoma is not so frequent now compared with some years ago, that we do not have it so often. When I first went to Kansas City eighteen years ago I used to have quite a number of cases of glaucoma coming to me and now, although my practice is three times as great, I do not see so many. Why this is, I do not know, unless it is that the etiology, the cause is back in a refractive condition of the eye; in other words, that the hypermetropic eye becomes glaucomatous and that in more recent times, during the past fifteen years these cases of hypermetropia have been more frequently corrected by the use of glasses and that this has acted as a prophylactic treatment of glaucoma, a preventive so to speak, so that we do not have these cases of acute glaucoma nearly so frequently as we did in former years.

DR. SUKER.—I was greatly interested in the Doctor's paper and I think it is a valuable contribution to the question, and it was particularly interesting to me because a few years ago I had a chance to watch a case of a similar character that at that time I did not consider a glaucoma, but rather a hæmorrhagic retinitis, in which twice during that time when I was looking at the fundus of the eye I saw little jets of hæmorrhage occur and noted the peculiar way in which the blood percolated inwards into the vitreous. In this case the history was that of a uric acidæmià in which large acid deposits were found in the immense spleen and also in the ciliary body, in the choroid and iris at the post-mortem. During the progress of the case there were repeated attacks of iritis. It was very much like glaucoma, yet the tension in the eye was at no time very much increased and sometimes was rather lower than normal. Sections were not made very carefully, however, of the entire eye so as to get anything like the interesting speci-

mens which the Doctor has given us, but I have often wondered since watching that case and numerous cases of detachment of the retina, or small areas of choroiditis, whether we did not have the gouty iris, the gouty choroid and gouty ciliary body to deal with, and whether many of these conditions were not, if we followed the history, mostly due to uræmic acid in the hypermetropic eye and consequent disturbances of nutrition. In some of the more recent works I have read of the clinical benefits derived from the treatment of gout and particularly of the advantage of the use of iodide of potash, the iodide of mercury and iodide of sodium, which were given to such individuals.

DR. BARCK.—I was more than usually interested in the interesting and very excellent paper of Dr. Alt, in so far as I had to remove one eye for hæmorrhagic glaucoma within the last year. I brought the specimen here as it will illustrate some microscopical points. It seems that von Graefe in the year of 1863 pointed out the connection between hæmorrhages in the retina and secondary glaucoma, and a number of these cases were reported, but the connection between the two conditions, between hæmorrhage and glaucomatous attack, was even then more or less obscure. The explanation as given by Dr. Alt seems to be very plausible, in so far at least, as it refers to cases where there is infiltration of blood into the vitreous. But a number of cases are on record where it is stated that the vitreous has been entirely transparent and where it has been found absolutely transparent after the enucleation. So an explanation of these cases at least is still wanting. There is one point upon which I would like to speak and that is the disc. It is uniformly said by all observers that in those cases of glaucoma there is no excavation of the disc. In a specimen which I have here an excavation of the disc is visible and as far as I have seen from the photographs which were reproduced to-night it is not doubtful as it seems to me that there is a small excavation of the disc.

DR. REYLING.—I have never removed an eye for hæmorrhagic glaucoma, but I have examined five eyes with hæmorrhagic glaucoma and I have found almost everything that Dr. Alt has stated, and they have all had deep cupping every one of them. I did not have any history of the cases except in one case, an eye that Dr. Webster removed on account of se-

vere hæmorrhage. The only way he could stop the hæmorrhage was by removing the eye and I found deep cupping. In the other there was more or less. I had no history of them, but found the same pathological condition.

DR. WHELOCK.—In 1889 I reported a case of hæmorrhagic retinitis with glaucoma in the *Journal of the American Medical Association*. The first symptom was defective vision, and following that the glaucomatous symptom came on. I did a sclerotomy as a protection against the too sudden relief of the interior pressure. The anterior chamber was slow in forming and as long as the wound remained slightly open the tension did not rise but after ten days it rose again and I did an iridectomy and saved the patient some vision, there was cessation of pain and I preserved the eyeball.

DR. DAYTON.—I agree with Dr. Alt in the matter of the final enucleation of hæmorrhagic glaucoma. However, it is possible sometimes, after informing the patient of the possibility of a failure by iridectomy to attempt it. There is no doubt but that good results have accrued from the operation of iridectomy. Dr. Tiffany spoke of the decrease in the number of cases of glaucoma, and that he has not had any cases recently. He may possibly recollect a patient that he had last summer with hæmorrhagic retinitis, followed by an iritis, which was a sort of migratory case. He left him shortly after calling on him and went to a colleague of his in Kansas City for treatment and some weeks after that presented himself at my office with absolute glaucoma. He gave me a history of the case saying, that Dr. Tiffany had diagnosed a hæmorrhagic retinitis, or as he expressed it, a hæmorrhage into the tissue of the eyeball, and that he had also had iritis, which the Doctor had treated for a while. Finally, for some reason, he went to another ophthalmologist, who gave him atropine to carry away with him and continue to use it, how long I am not sure but when he presented himself at my office there was an absolute glaucoma. Thinking, of course, that it was of the hæmorrhagic variety, I told him of the ordinary operation that frequently relieved the pain—he was suffering at that time a great deal of pain, and had not slept for many weeks, as he expressed it. I told him that the probabilities were that an iridectomy would do him no good, and that I thought the eyeball would have to be removed. However, I gave him a solution of eserine and

he used it very vigorously; he came back the next day and said he had a comparatively easy night. So I told him to continue the use of the eserine and he did so for a few days and finally transformed his affections to Dr. Gifford, of Omaha. Dr. Gifford did an iridectomy and wrote to me of the case saying that he probably would have to remove the eyeball, and a brother of his who resides in Lincoln, told me that the operation of enucleation had been done on a certain day. The result of the iridectomy I presume is good when there is no further hæmorrhage or rupture of the retinal vessels. In those cases where it is localized and where there is not an extensive rupture and the vessels are of a character to withstand the strain, iridectomy will undoubtedly be of service; but those cases, according to my opinion, are very few, and before operating by iridectomy—I am speaking of cases of hæmorrhagic glaucoma—I would always inform the patient of the possibility that a future enucleation may be necessary for the relief of pain.

DR. BULSON.—Speaking of hæmorrhagic retinitis being a precursor or hæmorrhagic glaucoma this recalls to me an interesting case, in which a lady presented herself with glaucoma, stating that several weeks before, while lifting, she had suddenly become blind. At the time that she paid her visit to my office she had a notable increase in tension and vision was *nil*. However, pain had not come on for some weeks subsequent to the development of the loss of vision. I informed the patient of the possibility of relief from iridectomy, performed the iridectomy without result and enucleated the eyeball. To me the case was of particular interest in view of the case which Dr. Alt has reported.

DR. TIFFANY.—I would like to say that I did not quite mean to state that I never have cases of glaucoma now; I did not mean to say that or to convey that idea, but what I do say and did say is, that I do not think they occur so often as they did formerly—acute cases. And I think these cases that we are speaking of now are not glaucoma but something else before the glaucomatous symptoms appear, and that is the reason we do not get any good results from iridectomy—in those cases we have retinitis hæmorrhagica and following that we have glaucomatous symptoms. But it is not glaucoma. If Dr. Reyling has a cupped disc in his cases those are glaucomatous

cases, those are not cases of retinitis hæmorrhagica. In the case presented this evening I did not notice a cupping of the surface. It was not a cupped disc.

DR. ALT.—Oh, yes, it was certainly but slightly cupped, more on one side than on the other.

DR. TIFFANY.—It appeared to me rather convex—part of it.

DR. ALT.—One part looked convex because the other was concave.

DR. TIFFANY.—In the cases that I have seen there was a decided cupping and the blood-vessels went out from the edge; of course that was not the case here.

DR. ALT.—I just want to answer Dr. Tiffany. Of course, in the photographs that I showed, the cupping is not so apparent in the high power photographs on account of the small portions of the disc shown, but there was a decided cupping. As I said, the cupping was rather small, but the lamina cribrosa was convex backwards. I also wish to recall to the Doctor, that I have not once in the whole paper, except in the title, spoken of hæmorrhagic glaucoma, but have referred to it always as a typical case of retinal hæmorrhage inducing secondarily glaucoma and that was the very standpoint which I wanted to take in this paper, and I am sorry if it did not come out. I do believe that hæmorrhagic glaucoma is nothing but a secondary disease induced by the hæmorrhages and not, as the Doctor misunderstood me, by the *serum* which is infiltrated into the vitreous body and carried into the anterior chamber but to the clogging of the filtration angle by the corpuscular elements of the blood, the blood cells. In order that this may happen it is not necessary at all that blood be found microscopically in the vitreous body or at least in large quantities. Not only blood cells but other cells can often be found in the iris angle by careful research, and I have found pigment cells there so often that I think it is a normal process; they are shed in the posterior part of the eye, from the choroid particularly, and are carried continually out with the stream of the fluids into the iris-angle, and away from there, and no not, in the usual run of things, cause glaucoma. In this connection I will say that I have a specimen, and am sorry I did not bring it, where there is gathered an enormous quantity of such cells in the iris-angle; it is just gorged with them and yet no glaucoma was induced,

because there was sufficient space to let the fluids pass through in spite of these cellular elements. With regard to the gouty diathesis, I agree with Dr. Colburn, and I had given this woman a milk diet, with lithia water, and iodide of sodium, as soon as she came. Ever since Dr. Ch. S. Bull published some very excellent observations some years ago on the frequency of eye troubles resulting from the gouty diathesis, I have always paid particular attention to it. But whether gout was the cause of the degeneration of the blood-vessels that I found in this eye and particularly of the pigment degeneration of the walls of the smaller blood-vessels and of the retinal capillaries, I do not know. It is the first time I have seen this condition myself. This is not the only case of hæmorrhagic glaucoma I have examined histologically; I have examined four other specimens; but this is the one I have examined most carefully and which I have had occasion to see clinically from the beginning to the end. Therefore I took this case for my paper.

BOOKS AND PAMPHLETS.

RETINOSCOPY (OR SHADOW TEST) IN THE DETERMINATION OF REFRACTION AT ONE METER DISTANCE, WITH THE PLANE MIRROR.
 By JAMES THORINGTON, M.D., Adjunct Professor of Diseases of the Eye in the Philadelphia Polyclinic and College for Graduates in Medicine. Twenty-four illustrations.
 Price, \$1.00. Philadelphia: P. Blakiston, Son & Co.

While the shadow test is regarded, by those who have carefully studied it, as the quickest and most reliable objective method of estimating errors of refraction, it is still not as universally used as it deserves to be. This may be explained possibly on the ground that the description of the method found in most text-books is not at all clear, and the beginner after making a few perfunctory trials gives up in disgust. We therefore welcome Dr. Thorington's practical little manual—an abstract of lectures on Retinoscopy delivered before the students at the Philadelphia polyclinic. The author gives in a concise way and with as few technicalities as possible the

essential facts which will enable any one to easily acquire a working knowledge of the subject.

Confusion is avoided by limiting the description to the method most generally adopted, *i. e.*, the plane mirror at one meter distance.

The text is profusely illustrated and the press work good. This is a first-rate manual for students and will no doubt assist in making a host of new advocates for Retinoscopy.

J. E. J.

PAMPHLETS.

"Can Tuberculosis be Diagnosed From the blood " By C. Fisch, M.D.

"Twenty-Eighth Annual Report of the Brooklyn Eye and Ear Hospital."

"Mouth-Breathing Caused by Adenoids, and Its Relief." By H. W. Loeb, M.D.

"Eighth Annual Report of the New Amsterdam Eye and Ear Hospital, New York"

"Binasal Hemianopsia, With the Report of an Additional Case." By C. S. Veasey, M.D.

"The Influence of Deafness Upon the Development of the Child." By H. A. Alderton, M.D.

"An Ophthalmoscopic Study of a Case of Hæmorrhagic Neuro-Retinitis." By Ch. A. Oliver, M.D.

"The Commitment of the Insane and the Insanity Law of the State of New York." By W. Jacoby, M.D.

"Einiges zur Lehre von der Entstehung und dem Verlaufe des Prodromalen und Acuten Glaukomaufalles." (Some Remarks Concerning the Origin and Course of the Prodromal and Acute Glaucomatous Attack). By W. Czermak, M.D.

DR. LOUIS A. LEBEAU, of this city, died Sunday morning, April 11, at the age of forty-eight years. He was for many years Assistant to the Chair of Ophthalmology at the St. Louis Post-Graduate School and the Missouri Medical College.

THE AMERICAN JOURNAL OF

OPHTHALMOLOGY.

VOL. XIV.

MAY, 1897.

NO. 5.

ORIGINAL ARTICLES.

THE VALUE OF WEAK LENSES IN MODERATE ERRORS OF REFRACTION.¹

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WITHIN the limits of this paper it is not my purpose nor would it be possible to discuss all of the phases of the question which I have chosen as my title, which must necessarily be subject to limitation. Conflicting ideas regarding the necessity or practicability of correcting moderate errors of refraction, as recently expressed by some of the leading ophthalmologists in letters to various medical publications, and my own decided opinions on the subject, leads me to bring the question before this meeting for consideration.

In no branch of the ophthalmologist's work is there more careful consideration and keen judgment demanded than in the correction of errors of refraction, and yet we not infrequently find an ophthalmologist who frankly admits that he

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

dislikes work of this character, probably because of the patience required in many cases, and therefore delegates the work to an assistant, or, unless the error be conspicuous, looks farther for the cause of the symptoms which bring the patient for attention.

Little wonder then that opticians, so-called "ophthalmic refractionists," and "doctors of refraction" vigorously ply the unnatural calling and cry lustily for professional recognition when by accident or chance a highly neurotic individual, former patient of ophthalmologist Jones or Smith, secured needed relief through them by the adjustment of a weak spherical or cylindrical lens.

A professional friend, an ophthalmologist of considerable prominence and no little experience, once said to me that he very rarely corrected an error of refraction of less than one diopetre, and never one under one-half diopetre, arguing that such slight errors do not produce sufficient disturbance to warrant correction, and that if diligent search be made other causes may be discovered that are responsible for the symptoms for which the patient seeks relief. To my surprise I find that this opinion is one held by many ophthalmologists, the paramount idea being that the muscles of accommodation should do a certain amount of work and that to interfere with this natural function is neither scientific nor rational.

While I am willing to admit that Nature should be encouraged to do its intended work, and that many other causes besides error of refraction may be responsible for eye symptoms, I am free to say that we come far short of obtaining satisfactory results by ignoring some of the most inconspicuous refractive errors, and in following hard and fast rules in the prescribing of glasses.

Our captious critic may say that an emmetropic eye is a rarity, and that therefore if it is scientific to correct all errors of refraction we will find it necessary to put a pair of glasses upon nine out of every ten people, and thus add weight to the comment of the late Bill Nye that we are becoming a "spectacled nation." I answer that the progress of civilization, with its attending dissipation in the use of the eyes under unfavorable conditions, is responsible for many of our eye troubles, and, as occupation and environment,—which in the majority of cases it is not within our power to alter,—play such an im-

portant part in the development of eye troubles, the larger percentage of ametropes would not only be benefitted but would abort graver troubles by even the temporary use of correcting lenses.

It is taken for granted that the ophthalmologist to whom eye sufferers appeal is not only a man of keen judgment and an unusual amount of patience, but one endowed with a feeling for humanity and scientific truth, and who places the patient's health and comfort above all other considerations. Such a man can not be accused of prescribing superfluous glasses, nor of giving lenses "having nothing but a mythical value" if he choose to prescribe what are ordinarily termed weak lenses, which an extended experience has shown him to be of the utmost benefit in a certain class of cases which is not insignificant in point of number.

"Eye-strain" is a term loosely applied, but ordinarily signifies an error of refraction that is attended by more or less direct or indirect irritation, producing any of the symptoms from inconvenience and annoyance to pain and disease. Sometimes it takes but a slight departure from emmetropia to produce reflex irritations and even serious disturbance in vision, while at other times a very large error may be tolerated for years with apparently no inconvenience or discomfort, this difference being essentially due to the occupation, health and requirement of the individual.

A certain amount of accommodative power usually remains in reserve, which, through the efforts of ill-health or extreme taxation of sight, may decline, only to be restored by removing the predisposing causes. No inconsiderable judgment may be required to determine exactly the course to be pursued, but in nine times out of ten the results will be all the better for having assisted in restoring the accommodative power by temporarily relieving the over-taxed muscles.

Noyes says that anomalies of refraction lie at the root of 50 per cent. or more of all the diseases of the eye, and he lays down the general rule that a most important point in the treatment of eye diseases is to restore the eye to a condition of emmetropia by suitable glasses. The truth of this assertion is attested by every ophthalmologist of considerable experience; for who has not seen a recurring marginal blepharitis, conjunctival irritation or congestion entirely disappear under the

influence of correctly adjusted glasses, the lenses perhaps even belonging to the class said to have but "mythical value?"

By far the larger percentage of people who consult us with decline of accommodation can not be said to be in ill health, but rather engaged in occupations which demand unusual taxation of the eyesight. Perhaps but moderate symptoms of asthenopia, conjunctival irritation, or reflex disturbances directly attributed to the eye, bring them to the ophthalmologist. Vision may be approximately $\frac{10}{xx}$, and under the influence of a mydriatic a lens of but one-half or even a quarter diopter accepted. It does very well to prescribe rest and tonic treatment but these cases must have other relief, for they usually occur in a class of individuals who can neither afford the time nor understand the necessity of recovering the lost muscular tone,—which gives reserve accommodation,—by cessation of employment. In all seriousness how can anyone consider a lens of "mythical value" which will not only relieve one of this class of sufferers but enable him to continue his avocation for months and even years without further annoyance?

I have tabulated 100 recent cases in which either spherical or cylindrical lenses of less than one-half diopter have been prescribed with highly satisfactory results. Among these cases are draughtsmen, engravers, decorative painters, typesetters and others demanding the highest acuity of vision, while not a few occur among stenographers, seamstresses, musicians, students, and others largely depending upon eyesight for the satisfactory performance of their work.

It has perhaps been truthfully said that along with other advancements of the age we are crowding our children in the schools. Be that as it may every year brings a larger percentage of school children under the observation of the ophthalmologist for relief from eye troubles which are invariably associated with eye-strain. Some of these cases of eye trouble are predisposed by ill health, others by neurotic temperament, while others are directly and alone due to extreme taxation of the eye-sight as a result of prolonged hours of study, oftentimes under the most unfavorable conditions as regards light. Presuming that the school work must and will be continued, which is generally the case, something besides tonics, hygienic regulations and rest must be prescribed, and in the majority

of cases correctly adjusted lenses is the principal thing that will not only give relief but enable the pupil to satisfactorily finish the school-year. Are we not giving the patient the best treatment by correcting these errors, be they even less than one-half diopter, when an abundance of evidence goes to show that the results are highly satisfactory? The value of weak spherical or cylindrical lenses is best attested by those who use them, and in my own practice the verdict is very strongly in their favor, and no more grateful patients are to be found than those among students and school-children who perhaps have suffered inconvenience and discomfort for months before discovering the cause of the trouble.

Not every error of refraction demands correction by properly adjusted glasses any more than every weak ocular muscle demands a tenotomy, for every case must be carefully studied and due discrimination used. Health, temperament, occupation and environment must play an important part in the determination of the character of treatment to be instituted, and in estimating the value of lenses in any given case we must take into consideration the requirements of the patient. Thus, a person following an avocation which demands considerable active exercise, either in or out of doors, will seldom, if ever, be benefitted by correction of a moderate error of refraction, as this class of individuals are usually in good health, and the eyes being not unduly taxed the reserve power of accommodation is maintained. The same may be said of anyone leading a sedentary occupation which does not call for more than ordinary use of the eyes. But, on the other hand, those individuals whose avocations require prolonged use of the eyes, or the highest acuity of vision, will eventually find even a moderate refractive error the immediate cause of inconvenience and discomfort. If the individual be suffering from impairment of general health, or is of a nervous temperament, the symptoms will not only be more aggravated but a less amount of ametropia is required to produce trouble. Thus in the case of a professional man of neurotic tendency, who has to all appearances enjoyed excellent health for years, an astigmatic error of but one-quarter diopter, under atropia, produced asthenopic symptoms of an annoying character which prevented prolonged eye work. Under full correction the patient has no discomfort,

and several attempts to abandon the glasses have ended in failure.

Numerous cases of this character might be cited as evidence to prove the value of weak lenses in moderate errors of refraction, and from experience in these cases only am I able to arrive at conclusions satisfactory to my own mind.

For my own part I prefer to examine the greater percentage of my refractive cases under the influence of a mydriatic, using homatropine except in those cases in which spasm of accommodation or other conditions demand atropia. In many instances but a part of the full correction is prescribed, due allowance being given for recovery of accommodative power through such assistance. In many cases, and this is especially true in the more moderate errors of refraction, the glasses are prescribed for temporary use only, or until the patient is free from prolonged eye-work. Students more particularly belong to this class.

The limitations of the use of weak lenses will therefore depend upon:

1. **OCCUPATION.**—Close application to any work demanding high acuity of vision tends to exhaust the reserve accommodative power and bring on direct or indirect symptoms of eye-strain, and but moderate refractive errors are necessary in some instances to produce trouble. Engravers, draughtsmen, decorative painters seamstresses, etc., are examples.

2. **TEMPERAMENT.**—The nervous individual is more susceptible to the influence of slight irregularities in vision than the phlegmatic. Many seamstresses, lady stenographers, china decorators, etc., belong to this class.

3. **ENVIRONMENT.**—Individuals following occupations that demand excessive use of the eyes in poorly lighted rooms—as inside office work—or who work wholly by artificial light, or work about objects which give much reflection are particularly apt to feel the influence of moderate accommodative errors. To this class belong certain book-keepers, newspaper men, type-setters, and students.

4. **HEALTH.**—Any impairment of health generally has its debilitating effect upon the eye-muscles and hence many convalescents or semi-invalids, even with but moderate errors of refraction, in attempting to pass the time by reading, soon discover symptoms of "eye-strain" which in many instances may

be relieved by properly adjusted glasses. Consumptives, victims of spinal lesions, and others of similar constitutional debilities come under this division.

In conclusion I have to say that there is not the slightest question in my mind as to the value of weak lenses in many cases of moderate errors of refraction, and while no definite rules can be formulated to govern the ophthalmologist in prescribing glasses I am convinced that he can not obtain the best results in all cases if he omits weak lenses from his means at hand for the relief of certain forms of eye-trouble directly or indirectly due to moderate refractive errors.

DISCUSSION.

DR. J. ELLIS JENNINGS.—The paper read by Dr. Bulson presents a question which is often a puzzling one. There are certain cases which seem to be benefited by the correcting of, say, half a diopter. But we must ask ourselves: are there not other points which we must take into consideration? Is the child at school sitting in a correct position? Or, is it studying too much? Because we know that even normal eyes, if subjected to too much work, will show irritation. Can we not often trace the difficulty to the child's course of study or the position in which the child sits at its desk; can we not by some method put the child's eyes at ease without putting on a pair of glasses? I do not think it is necessary in all these cases, where there is a quarter or half diopter defect, to use glasses. I had a case this morning that will illustrate one point. A young man, aged 21 years, has been wearing a pair of glasses for two years; he had got them down town at one of the optical stores and he said he had, till lately, experienced considerable relief by using this pair of glasses; that before he got them his eyes were red and he was having considerable difficulty with his eyes. However, recently when he had done considerable work, his eyes began to hurt him again. I examined the glasses he had worn for two years and they were about $-\frac{1}{12}$ D. cylindrical. I then examined his eyes under homatropine and found the correction he needed was $+0.5$ D. with $+0.75$ D. c., ax. 90° . Now how do you imagine that pair of $-\frac{1}{12}$ D. gave him relief for two years. Don't you think there was something else at the bottom of the trouble,

that possibly he did not work as hard, or took better care of his eyes? So I think we must take all these questions into consideration before we put on a pair of a quarter diopter cylindrical or half a diopter spherical glasses on a child that comes into our office.

DR. DAYTON.—I do not understand Dr. Jennings' idea; I do not exactly get the drift of it. Certainly Dr. Bulson does not mean that in a case which does not demand a $+0.50$ D. or a $+0.75$ D., we should put on a weak cylinder. But he means that if there is an error of refraction, if it even is not greater than perhaps 0.25 D., it ought to be corrected, and in my practice of the last 16 years I have been in the habit of correcting every error of refraction, even if it was only 0.25 D. I can recall to my mind one case in particular which passed from oculist to oculist, a lady of highly nervous temperament who had received no benefit from all the treatment that had been given; she had no glasses, none had been given her because the error of refraction, under homatropine, was only 0.25 D. c., ax. 80° and 100° . There was a slight conjunctivitis scarcely enough to cause such symptoms and nervous manifestations as she complained of. I corrected the refraction—gave her a 0.25 D. c., at the axis mentioned, of 80° and 100° —and the result was perfect. She complained no longer of her troubles. There were no muscle insufficiencies, and as a fact this case was relieved by these weak cylindrical glasses. There was no mind-impression, no hypnosis, or anything of that kind used to influence the patient. Thus the cylinder must have done the work. I heartily agree with Dr. Bulson in his idea of refracting these cases even if they are small and if there is only a slight error. Dr. Jennings spoke of an important point and made a good hit I think in regard to the position of school children; they are prone in their first year in school to bend over too closely at their work or to bring their work too close to their eyes.

DR. FRYER.—I was very much interested in Dr. Bulson's paper. I am quite convinced that he is in the main correct, probably altogether correct. I am sure it is absolutely necessary to correct every degree of astigmatism when the cylinder has to be placed against the rule. There should be no question about that. Very often, as Dr. Bulson says, we can use some judgment in the lower degrees of astigmatism when with

the rule. But I believe we should even correct lower degrees with the rule oftener than not; but we should always correct fully all astigmatism against the rule.

DR. BULLARD.—It has been my experience that the patients that have been most grateful for relief from eye-strain, have, in many instances, been those with a low degree of astigmatism. I make it a rule to correct all degrees of astigmatism even down to 0.25 D. when the patient can not be benefited in any other way. Some of these cases, too, have muscular errors and may be relieved by prism exercises. If I can not eliminate their troubles in any other way I invariably correct low degrees of astigmatism. In order to paralyze the accommodation I have been in the habit of using discs containing gr. $\frac{1}{50}$ of homatropine, with gr. $\frac{1}{50}$ of cocaine. I have found that in children this is sometimes not sufficient. Somehow my experience with homatropine has not been very satisfactory. I usually put in one of these discs in each eye and repeat it in fifteen or twenty minutes, and at the end of one hour from the application I make the examination. Sometimes I do not succeed. But at any rate I believe a great deal of benefit is derived from the correction of these low errors.

DR. COLBURN.—Dr. Bulson has certainly presented a very interesting paper and one which interests all of us. In this connection I wish to mention a couple of cases of misfits in grinding which I have come across recently and which attracted my attention particularly inasmuch as the good name of one or two of my colleagues was brought into question in their correction. First, I saw a young lady with a pair of weak cylinders; she had been corrected by a member of this Society but the correction had proved a failure, even an absolute nuisance. I examined her refraction again carefully and found exactly as the Doctor had found. Then I began to wonder why the test lenses showed one result and the glasses another. I neutralized the glasses in a rough way and found that they were apparently correct; but in handling them before the light, getting the reflection of the window-frame across them, I found right in the centre of the glass, a little spot, which had not been ground. It was less than $\frac{1}{16}$ inch in diameter. The cylinder had been beautifully polished and everything seemed correct, and it was only by holding the glass in such a way that I got the reflection of the window-frame across the cylin-

der that I discovered the error in the grinding. In another case I had a similar experience. Here the apex of a sphere was not ground, but beautifully polished. I sent the glass back to the gentleman who ground it and asked him to inspect it. He failed to discover the error and I pointed it out to him. I have wondered if that does not occur in other cases where relief is not obtained. In another case, that of a school teacher, a correction for astigmatism of low degree had been given. It was carefully done, still she obtained no benefit from the correction. She could use her eyes comfortably, but invariably had an eye-strain headache at night, until she was obliged, for many days, to lose half a day from school. It then occurred to me that there might be some other cause than the error of refraction, and I found from her diagram of the school room, that she was occupying a position facing four large windows. She simply had retinal exhaustion and following this came the utter inability to carry out the remaining part of her school work. I have found that frequently since, in the case of ministers, school-teachers, clerks and book-keepers working in a bad light, and I think that the trouble is not altogether in the error of refraction but in part due to ill-adapted light producing irritation.

DR. TIFFANY.—I think with the essayist, that as a rule, we should correct these low forms of astigmatism, but we should be very careful to make the correction as has been said by Dr. Jennings. Sometimes the patient comes to us with a minus glass where he has a hypermetropia or a hypermetropic astigmatism. As a rule, where there is a slight compound hypermetropic astigmatism, I correct the astigmatism but not the hypermetropia. The ciliary muscle is inclined to work and I allow it to perform its functions, and I find my patients do better by giving the eyes merely the cylinder. Dr. Fryer speaks of correcting astigmatism when it is in the opposite, when it is against the rule, but we must be sure it is against the rule. Mistakes can only be prevented by the use of a cycloplegic. Then, in other cases, you may have to use a mydriatic to reduce the spasm of accommodation, before you can find the proper glass. I have found, especially with students, that if you correct the error of refraction, even if it is slight, you put the eye at rest and it recuperates, and within a

few months or so, the student is able to lay aside the glasses and go about his work.

DR. REYNOLDS.—I want to indorse the essayist, but I want to call attention to this fact, which I believe needs more emphasis, that whenever I prescribe glasses for a patient I prescribe also what sort of a frame he shall wear. I do not prescribe cylindrical lenses in a pinch-nose attachment. I tell the patient what sort of a frame he shall use, and if he will not accept it, I wash my hands of the whole matter and I refuse to take further responsibility in his case; I would rather he would go to somebody else. I think this matter of insisting on a correctly adapted frame should receive more attention, then much better results would sometimes be obtained.

DR. FRYER.—I concur with what Dr. Reynolds has said, and I think it is absolutely as important as the selection of proper lenses; the glasses must be properly centered and each pair of glasses must be suited and adapted to the particular patient. This is particularly true where there is muscular trouble. You can not properly treat such cases unless you have suitable frames. I am like Dr. Reynolds; I insist on people wearing spectacles when they have astigmatism and it is equally essential that the spherical lenses should be properly centered, unless we order otherwise.

DR. CORR.—I wish to commend Dr. Bulson for presenting his paper for many reasons. The matter of refraction constitutes a large part of our work and anything that enables us to thoroughly understand it is of great importance. The question which the Doctor draws out in his paper is the prescribing of very low degree lenses for the correction of slight trouble. The answer to the question, in my opinion, depends on what is really the matter. If there are symptoms of asthenopia and even a very small error, that is what I prescribe for: but I have seen conditions where a perfect correction with ability to use the eyes would not stop the pain. In such cases, no matter what the correction may be, the patient may have gotten into a condition in which the use of the eyes for any purpose causes discomfort, and unless the eyes are rested for a long lapse of time, the cause of the trouble will continue. This matter was discussed before the Chicago Ophthalmological Society resulting in the view that in such eyes there is simply a painful condition of the muscles. I forgot the name that was

applied to this condition, but it grows out of the habit of the patient with the uncorrected error of refraction, and its correction will not always relieve the muscular pain. Now we all know that there are other cases which we can not relieve, except through the mind of the patient. They are of a kind with that of the woman who supposes she is troubled with falling of the womb, and who, after she has been told that she is relieved and a pessary has been put in, will go away satisfied, although no pessary has been inserted. So there is a class of cases of painful eyes which will yield to suggestion only. As to the relative value of atropine and homatropine, I can not quite understand how I could transact my business simply with the use of atropia. Homatropine, to my mind, is a boon in refractive work, because we can get through a case in a day.

DR. TIFFANY.—I wish to remark that a very celebrated optician—a wholesale and retail man in Chicago, who has an immense practice in filling prescriptions from oculists, says that four-fifths of the trouble that he has, comes from the oculists; the opticians have less trouble with the glasses they prescribe than the oculists.

DR. REYNOLDS.—Who are the oculists?

DR. TIFFANY.—The oculists are the prominent men of Chicago and all over the country; and this optician says they are the persons who make the trouble.

I wish to say this, that if you do not want a complete cycloplegia, homatropine will do; if you want to correct fully you should not trust to homatropine; if you want to reveal the true amount of error, homatropine will not serve, you must use sulphate of atropia. Homatropine will dilate the pupil fully but it will not produce complete cycloplegia. If you only want to correct a part of the astigmatism or hypermetropia you can use homatropine.

DR. REYNOLDS.—I simply wish to protest against the use of the term oculist as applied to the medical practitioners who practice ophthalmology and the allied branches. I do not know an institution in the United States that turns out oculists. We are doctors of medicine, and I always take pains to impress upon people that I am a medical practitioner—a doctor of medicine.

DR. BARCK.—I should like to hear the President's views on this question.

DR. ALT.—I have very little to say on this subject. As I grow older I try more and more to give my patients as much comfort as possible, to enable them to work as much as possible and trying to reach this I find that it will but rarely do to give a full correction of the ametropia which is present. For instance, if in a case atropine, which I use—as I have discarded homatropine after a thorough trial continued over two years—shows me that there is a hypermetropia of 3 dioptries and the patient is only comfortable when he wears a glass of 1 dioptre, I order 1 dioptre. This practice, has grown out of what is now quite a number of years of experience. There was a time when I was younger, when I corrected the whole ametropia and forced the patients to use the glasses indicated. In those days I would tell my patient peremptorily to wear those glasses, and if a patient came back to tell me he could not wear the glasses I had prescribed, I would tell him, you must wear those glasses, and if you will not do as I direct, you may go where you please. I have learned better and I try to fit my patient as near as possible to his degree of ametropia and yet try to make him comfortable. Sometimes a full correction can be worn, but if the patient can not do so, I try a weaker glass which he may wear with comfort. There is frequently a discrepancy between the faculty of accommodation and the degree of ametropia which does not allow of a full correction and will only change gradually under the use of glasses which slowly rise in strength. In regard to the correction of small degrees of error I am guided by the same principle. If the patient has 0.5 D. of astigmatism or hypermetropia and is decidedly benefited by wearing such glasses I will most assuredly give them to him, but I would not insist upon a patient wearing a glass of that strength or weakness all the time on his nose when he has no use for it. I try to do the best I know for each individual case, never forgetting that I have to deal with a living eye and not with an optical instrument.

DR. COLBURN.—It seems to me also that the whole question resolves itself into this, that we must treat each individual patient according to his symptoms and condition. As regards the selection of a frame, it is sometimes difficult to get a proper adjustment. For many years I have made it a prac-

tice to have my assistant fit a frame to the patient's face; I have a large box of frames of various styles, and he takes a pair of plyers and fits a frame to the patient's face. Then this frame is sent to the manufacturer and a duplicate is made and the original is returned to me. I also attend myself to the placing of the glasses on the patient and see that they are made according to the prescription.

DR. BULSON.—I feel highly complimented that this paper has drawn out such an extensive discussion. I am willing to admit that it is an old subject, but from the discussion I think we can learn something yet. I thought I brought out in the paper the fact that every case is a law unto itself, I at least intended to bring it out. Yet we know that we find cases in which there is a moderate error of refraction and the question is, whether the disturbance is sufficient to warrant correction. My object in presenting this paper was to bring out a discussion on the point as to whether it was advisable to prescribe these weak lenses. This was suggested to me by a remark that was made in one of the ophthalmological societies by a noted ophthalmologist who stated that a lens below 1 diopter had a mythical value and that he would not prescribe it and never had, and that he considered any ophthalmologist foolish who did so. To this I say, I am willing to be accused of foolishness in prescribing lenses under 1 diopter. I do not pretend to say that in every case in which the total hypermetropia or the total astigmatism is but 0.25 or 0.5 D. it should be corrected. Not by any means. The temperament and surroundings of the patient, the health of the patient will determine what correction should be given. This work makes up nearly fifty per cent. of the work of most ophthalmologists, and the man who does not pay attention to errors of refraction and give to them his scientific consideration the same as he would to a case of cataract, glaucoma or corneal ulcer falls short of doing his duty. When such patients come to me I first determine the amount of manifest error, and after that, if the patient is young—and young people are the ones most apt to have this trouble, I use homatropine. I prefer the discs manufactured by Wyeth & Co. I place one of these into each eye every ten minutes and blindfold the patient. This is done by an assistant and who also records the exact time. At the end of the time I take the bandage off, wash off the accumulation

of gelatine and at the end of fifteen or twenty minutes begin the examination and I very rarely have a case which does not give up the total amount of the error. I have tested this repeatedly with atropine following the homatropine and have found no more error than shown by the homatropine. I agree fully with Dr. Alt in regard to the old rule. I do not believe in correcting the full amount always. I have in mind particularly a patient who came from as good a man as Dr. Noyes. She had an immense amount of discomfort and headache when she attempted to read at all, and she did not think anything could be done for her since she had been to the specialists in New York and other places and received no relief. I asked her whom she had consulted and she named Dr. Noyes, and I said if Dr. Noyes can not help you I am afraid I can not do it either. She told me, he said: these are the glasses which are suitable for your case; but she said she could not wear them, they would drive her crazy. I examined the glass, it was $+ 3.5$ D. s. I put her on the chair and examined her vision and found it $\frac{20}{xx}$ and the highest glass she would accept was 0.5 D., in other words, that was her manifest hypermetropia. Under the influence of a mydriatic I found the amount of error was just equal to what Dr. Noyes had given the glass for. So that Dr. Noyes had given the right glass, but she could not use it and I gave her a 1 diopter glass and told her to wear that until she found symptoms of discomfort present, and when she found that to come back. She stated to me that it was perfect, that she never had seen with such comfort in her life. She did not have a particle of discomfort for three months; she read and sewed. At the end of that time she told me that she could not read with the same degree of comfort that she had before. I substituted a $+ 2$ D. and when last I heard from her she was wearing that lens comfortably notwithstanding her hypermetropia is a great deal more than that. So I think we must in this way use a certain amount of discretion. I will say this, that in these cases of a small amount of error of refraction we do often find a good deal of trouble, especially in students. We find many students in the university with moderate errors of refraction which create oftentimes a disproportionate amount of disturbance. My attention was first called to this matter in my own case. I have a hypermetropic astigmatism of 0.25 D. I was suffering in my

student days with intense headaches and consulted an ophthalmologist; he examined me under atropine and found A 0.25 D., but he thought it was useless to correct. I told him I had headache; he said, I hardly think that is produced by this refraction, but he corrected it, and I have worn the glasses ever since with comfort and it is not imagination with me either. If I go without my glasses an entire evening, the next morning I have an intense headache—that is, if I do two or three hours' steady work. I can not get along without this glass.

A CASE OF OCULO-MOTOR PARALYSIS WITH SCOTOMA OF VISUAL FIELD.¹

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THE patient, G. S., aged 36 years, male, colored, single, brick maker by trade, was first seen at the clinic at the University Medical College, January 30, 1897. About three months previously he first noticed that the right lid began to droop and that he saw double, and was dizzy when both eyes were open. The drooping of the lid increased until the pupil was entirely covered and has remained so since.

The patient is a muscular, well-developed man in good general health. The family history is good, or at least negative. No history of tuberculosis or cancer. He has had syphilis, the initial lesion occurring about sixteen years ago. No other tertiary lesions are known to have developed. About two years ago he had purulent dacryocystitis on both sides resulting in fistulæ. The left one subsequently closed, but the right one still remains patent, but minute, and pus can still be squeezed from it.

General health good at present. No evidence of tabes dorsalis or other disease of the spinal cord—reflexes all normal.

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

mal and the patient stands readily with eyes closed. There are no paralyses aside from those of the ocular muscles, and no abnormalities of sensation. Urine normal in amount, sp. gr. 1022, and contains neither albumen nor sugar.

When first seen at the clinic the following condition was present: Complete ptosis of the right lid, with ability to raise it only slightly by the aid of the right frontalis,—not at all when the frontalis was fixed by pressure on the supra-orbital ridge. On raising the lid the eye was found to be considerably abducted, and could not be moved in any direction except outwards and slightly downwards. The pupil was moderately dilated and not responsive either to light or accommodation. Examination showed binocular diplopia, crossed, the false image slightly higher, and with its upper end inclined to the right.

There was a positive scotoma in the temporal field of the right eye, amounting almost to hemianopsia. The blind area, approximately semi-circular in outline, approached to within about 10 degrees of the point of fixation on the horizontal meridian. Over most of this area objects could be perceived, but only indistinctly. The hand could be seen but fingers could not be counted. L. V. = $\frac{20}{xx}$; J. No. 1, 8"—20". R. V. = $\frac{20}{xxx}$, not improved by glasses. The inability to improve vision by glasses indicated that the impairment of vision was due to a diminished conduction in the macular fibres, and not to an error of refraction made manifest by the paralysis of accommodation. Tension was normal, no tenderness on pressure. Conjunctiva uninjected. Cornea and all refracting media clear and fundus normal, except, possibly, a slight haziness of the disc.

We have then to determine—first, the character of the paralysis, *i. e.*, what muscles are involved; second, the location of the lesion causing the paralysis; third, if possible, the nature of the lesion.

Fuchs says: "The diagnosis as to which muscle is paralyzed often presents considerable difficulties even to the adept, if the case is complicated. This occurs when several paralyses are combined." In this case, however, it is not difficult to determine what muscles are affected.

The ptosis, the position of the eye, its loss of motion in all directions except outwards and downwards, the position of

the false image, the dilatation of the pupil and loss of accommodation, show a paralysis of the levator palpebræ superioris and all the internal and external muscles of the eye except the superior oblique and external rectus, *i. e.*, complete oculo-motor paralysis of the right eye.

The location of the lesion is scarcely more difficult to determine. Paralysis of the ocular muscles may be classified, as regards the seat of the lesion, as follows:

1. Peripheral. (a) Intra-ocular; (b) Orbital; (c) Basal; (d) Fascicular (root paralysis).
2. Intermediate (nuclear).
3. Central (cortical).

In this case an intra-ocular lesion is of course excluded, since extra-ocular muscles are involved. There was no indication of orbital trouble,—no tenderness on pressure, no exophthalmos, no inflammation, and the eye was freely movable in the direction of the unparalyzed muscles. A fascicular lesion involving the entire oculo-motor root would almost of necessity cause other motor or sensory disturbances.

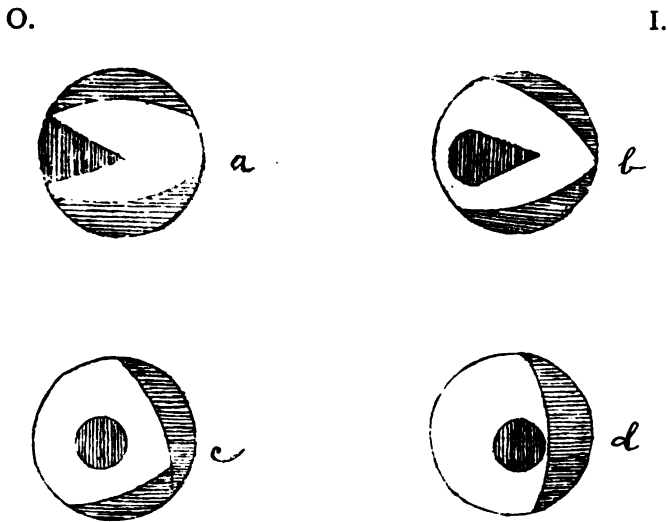
Complete oculo-motor paralysis might possibly be due to a nuclear lesion, though hardly without some involvement of the other eye, especially when the onset is sudden. No cortical centers are known for any individual ocular muscles except the levator palpebræ. Moreover cortical lesions cause disturbances of associated movements rather than paralysis of separate muscles.

But the scotoma in the visual field is a very positive localizing indication. A lesion causing monocular scotoma *must* be anterior to the chiasm, and if the scotoma and the paralysis in this case are both due to the same lesion, it must be one located at the base of the brain between the chiasm and the apex of the orbit.

One point of special interest should be mentioned here,—the bearing of this case on the arrangement of the fibres in the optic nerve. According to Siemerling and a majority of investigators, the uncrossed fibres going to the *temporal* half of the retina, lie at the temporal side of the optic nerve. Schmidt-Rimpler, however, in a case of cortical hemianopsia with secondary optic atrophy, found the crossed fibres from the *nasal* half of the retina at the temporal side of the nerve in the re-

gion of the optic foramen. The arrangement of fibres as given by him is shown in the accompanying illustration.

As the motor oculi at the base of the brain lies to the outer side of the optic nerve, any lesion involving both would necessarily affect the temporal side of the optic,—a condition which exists in this case. But as the scotoma was in the temporal field of vision, the nasal half of the retina must have been affected. This would agree completely with Schmidt-Rimpler's arrangement.



Transverse section of right optic nerve seen from the front. O, temporal side; I., nasal side. *a*, region of lamina crelerosa; *d*, in optic foramen. Macular fibres shaded vertically, uncrossed, horizontally. From Knies—*Eye in General Disease*.

The exact nature of the lesion can not perhaps be stated so positively. However, there was no indication of meningitis hæmorrhage, or aneurism, and no reason to suspect tubercle. The specific history makes us, of course, suspect some syphilitic lesion, and of these gumma is the most probable. Moreover, our diagnosis in this cases is aided by the fact that active anti siphilitic treatment has resulted in a steady improvement in all symptoms.

February 20, 1897, three weeks after beginning treatment, the scotoma had nearly disappeared, and there was some mo-

tion of the eyeball in all directions. The lid could be raised above the pupil, but the patient still kept his eye closed on account of the diplopia.

March 28. The visual field is perfectly normal. R. V.= $\frac{20}{xx}$, J. No. 1, 8"—20". Motion inwards and upwards is still somewhat impaired, and there is diplopia on looking up and to the left, but the patient keeps both eyes open and says he can see as well as ever.

The diagnosis then would be—complete oculo-motor paralysis of the right eye with scotoma of the temporal field, due to pressure on the optic and motor-oculi nerves, between the chiasm and the apex of the orbit, probably from a syphilitic gumma.

DISCUSSION.

DR. COLBURN.—I have been interested in the Doctor's paper, it is especially interesting to me, because I have seen a case similar in some respects. About a year ago Prof. Lederer referred a gentleman to me,—a personal friend in whom he was greatly interested, and I found that the Doctor was greatly concerned, fearing that the patient had tubercular disease of the brain, as he had been having a slight increase of temperature and there was a previous history of an apparent cure of tuberculosis of the lungs. The gentleman had regained apparently perfect robust health. Then an elevated temperature showed itself combined with some mental disturbance and excessive nervousness, and this made the Doctor very anxious, fearing the patient had tubercular disease of the brain. About this time the patient began to have paralysis of the muscles of the right eye,—I can not give the order in which it came,—but it went from the abductor to the other muscles, and was followed by ptosis. Then the left eye became involved and he had a systematic rotation of paralysis beginning with the third and going on until one after the other, nearly all the muscles were involved. Now the Doctor was suspicious that there was tuberculosis. My impression was that we had a septic condition to deal with. I began to study the patient with reference to this. In examining the crypts of the tonsils I brought out membranes or brought out substances that Dr. Lederer examined under the microscope and pronounced staphylococcus accumulations in large mass. We

then removed portions of the tonsils, examined the removed portions, and found large cavities from which the infection was taking place. After the removal of the tonsils the temperature became normal, the patient gradually became better and the paralysis of the various muscles improved very rapidly. He had been under all sorts of anti-phlogistic treatment without any good result. Everything that could have been anticipated was done in the case, but until the tonsil was thoroughly cleared out there was no improvement.

DR. STILLSON.—There is one point the Doctor did not mention, and that is, that the recovery of these cases of ocular paralysis is spontaneous in some cases, as in locomotor ataxia. In locomotor ataxia these symptoms of paralysis will come on one after another; there may at first be paralysis of the third nerve, by and by the pupil will become involved, there may be paralysis of accommodation or perhaps ptosis, and then the locomotor ataxia symptoms appear further down. The eye symptoms appear early, diplopia appears and then passes away; then the paralysis of the muscle of accommodation may get better and then again get worse. There may also be reflex throat troubles, spasmodic closure of the glottis, which will get bad, then get better and possibly pass away entirely. So we are sometimes liable to deceive ourselves when we attribute a cure of the ocular paralysis to a removal of adenoids or tonsils or what nots, and I think it wise for us to bear these things in mind, particularly when we have a paralysis occurring in locomotor ataxia or in cases due to rheumatism or gout.

DR. BARCK.—The most interesting points in the paper are the two points just mentioned. But I can not concur with the conclusions drawn by the author. I can not agree, that from the presence and location of the scotoma we can arrive absolutely at the conclusion that the seat of the trouble must be located in front of the chiasm. I believe we should state exactly what we know and what we do not know; and I believe that we all will be willing to admit that we can not tell how the fibres are running which cause the trouble. You are all aware of the fact, I suppose, that the idea which so long obtained of a semi-decussation of the fibres of the optic nerve in the chiasm is now questioned considerably. Within the last few years it has been maintained by several observers at least, that instead of a semi-decussation there is a total decussation

taking place in the chiasm. So I think we had better content ourselves with stating what we do and do not know, and at present we do not know anything positive about the course of the fibres of the optic nerve at any distance or immediately behind the eyeball itself.

DR. FRYER.—I wish to say a word of commendation of the Doctor's paper. And the important point seems to me in calling attention to the location of the lesion. I believe and the majority of oculists will, notwithstanding these latter claims of gentlemen whom Dr. Barck alludes to, that experimentations heretofore have proved a decussation. Dr. Bellows speaks of the rarity of these lesions of one nucleus. This is true, but occasionally we find a lesion on autopsy located in a single nucleus.

DR. BELLOWES.—I have just one remark to make in closing in regard to the semi- or total decussation. As Dr. Barck says, the general view heretofore held, has been that of semi-decussation; but that this view has been changed of late. I believe in semi-decussation. There is one case reported by Dr. S. Weir Mitchell of bi-nasal hemianopsia in which on autopsy it was found that an aneurism totally divided the chiasm from before backwards. Now if this case is correctly reported there must have been a semi-decussation otherwise the total division must have produced total blindness.

ASTIGMATISM.¹

BY DUDLEY S. REYNOLDS, A.M., M.D., LOUISVILLE, KY.,

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HOSPITAL COLLEGE OF MEDICINE, MEDICAL DEPARTMENT OF THE CENTRAL
UNIVERSITY OF KENTUCKY; SURGEON TO THE EYE AND EAR DEPARTMENT OF
THE LOUISVILLE CITY HOSPITAL, AND THE GRAY STREET INFIRMARY.

THIS report is based upon the recorded observations of four thousand six hundred and eighty-four (4,686) persons, excluding, as far as possible, all cases of presbyopia.

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

I rely absolutely upon the stenopaic disc, and the test type of Snellen, illuminated always with parallel light, with the patient's accommodation completely suspended. This is the only method which I consider worthy of the confidence of either the patient or the practitioner.

Total number of cases	4,686
Total number of cases of spherical error requiring correction	3,450
Number of cases with H. in one eye and M. in the other	168
	3,282
Astigmatism H. in both eyes	380
Astigmatism H. Comp. in both eyes	254
Astigmatism H. one eye only	232
Astigmatism H. Comp. one eye only	185
Mixed astigmatism in both eyes	54
Mixed astigmatism in one eye only	37
Astigmatism M. in both eyes	76
Astigmatism M. Comp. in both eyes	89
Astigmatism M. in one eye only	44
Astigmatism M. Comp. in one eye only	57
	1,408
Persons with H. astigmatism in one eye and M. astigmatism in the other eye	4
	1,404
Astigmatism of oblique axis	206
Astigmatism of different degree in each eye	154
Astigmatism at right angles in both eyes	167
Astigmatism in one eye only	555
Astigmatism of same degree and axis, both eyes	322
	1,404

It may be interesting to observe that the mydriatic used in the first 576 cases, in which there were 113 cases of astigmatism, was sulphate of atropine. In the remaining 4,110 cases, in which there were 1,291 cases of astigmatism, the

mydriatic used was the hydrobromate of homatropine. The manner of employing the latter has been varied; at first I used one grain to two drachms of distilled water, dropping the solution into the eyes every fifteen minutes until four applications had been made. This method proving unsatisfactory, I doubled the strength of the solution, and employed it every five minutes until four applications had been made. In a large number of experimental observations to determine just when the accommodation is suspended under this method of using the mydriatic, I concluded thirty-five minutes to be the minimum, and fifty minutes to be the maximum time required to produce complete suspension of accommodation.

In the last 2,000 cases, I have employed ten instillations of the homatropine solution, in the strength of one grain to the drachm of water, the instillations being one minute apart. I find that complete suspension of accommodation is almost invariably present forty-five minutes after the last instillation, and that the effects have begun to fade away at the end of an hour and a half. I have occasionally found it necessary to repeat the instillations, causing the patient to remain another half hour, after the last, and, in the repetition of the instillation, I deem four applications quite sufficient. I have never known a case, even in high grades of astigmatism, which would not finally succumb to the action of homatropine. I have, in twenty or thirty cases, found a third repetition of the instillation of the homatropine necessary.

DISCUSSION.

DR. JENNINGS.—I wish to make a few remarks as to the different mydriatics. I have tried all of them. Lately I have been using scopolamine very largely, but I have finally drifted back to homatropine because I could not see that it had any particular benefit. I could not discover any marked error of refraction which would be brought out by scopolamine and not by homatropine. It has the same disadvantage as atropine; the patient is not able to do his accustomed work for at least three days, and sometimes four or five, and when the mydriatic has about half lost its effect the patient naturally tries to use his eyes and naturally more or less eye-strain will result, and you will thus keep up a condition which you have in the be-

ginning tried to get rid of. There is, however, one point that I would urge strongly, and that is the proper application of homatropine. The lower lid should not be drawn down and a drop of homatropine put into the conjunctival sac, but while the patient looks down a drop should be put on the upper edge of the cornea. As the eye rolls up this is evenly distributed over the whole surface of the cornea. If it is merely put into the conjunctival sac sometimes we do not get a perfect paralysis of the accommodation.

DR. CORR.—I am glad that the Doctor has read this paper as it brings up the subject which was discussed before the Ophthalmological Section of the American Medical Association at Baltimore. Some gentleman gave some such table as this, but not so complete. I am particularly struck with this point, that in my practice I have found the per cent. of mixed astigmatism to be about two. Dr. Würdemann, I think, reports about the same per cent. Some of the gentlemen who discussed that paper gave a great deal larger per cent. I have always acted on this principle, that static refraction can be responsible for astigmatism in but one meridian. If there is an astigmatism of another meridian it must be due to dynamic refraction. Now if we can wholly set aside the dynamic refraction by means of mydriatics, we ought to do away with astigmatism due to that, and if so, we ought to be able to resolve everything into a simple astigmatism from a compound one. I have acted on that principle and have resolved quite a good many of the cases that appeared by superficial examination to be cases of mixed astigmatism, but I have not succeeded in reducing all. I think if I had continued the experiments I would be able to still further reduce them. You can not have an astigmatism in a static refraction except in one meridian.

DR. DRIVER.—I would like to inquire what part of the hypermetropia is corrected in his compound hypermetropic case; if the Doctor makes a complete correction or only a partial one.

DR. P.—The paper is certainly a very valuable one, and it has required a large amount of work in preparing it; the Doctor is to be congratulated on his work. I can not quite agree with the Doctor as to the effect of homatropine. I have not been able to get the effect even where I have used a dou-

ble dose. I used Merk's, but could not get a complete cycloplegic effect, and I used the instillations every five minutes for an hour. I can scarcely agree with Dr. Jennings in his statement about scopolamine. By the careful use of the drug I have had, with the ordinary dose, the same effects as I would with atropine, but I certainly differ in regard to the effect of homatropine. It would be a very good thing if we could always rely upon it, but I am certain that in young people we can not.

DR. DRIVER.—I wish to say that I agree with the Doctor. In young people I have found nothing so satisfactory as the sulphate of atropine. I have tried the other drugs, and although I have not had a very large number of cases, I can say that we do not get the paralysis that we have a right to expect, and therefore I have discarded it and now rely wholly upon the atropine, notwithstanding its disagreeable effects for four or five days. I consider it the most efficacious and most reliable.

DR. REYNOLDS.—I am very much obliged to you gentlemen for the discussion, and I will try to answer the objections and criticisms that have been made, and I will go backwards in reply. In regard to homatropine, of course I do not know how you gentlemen use it, nor what particular dose you apply nor how you determine the presence of complete cycloplegia. I began to record my observations late in my professional life. I am sorry I did not commence to record them sooner. I found, however, that it would not do to use with my patients sulphate of atropine and keep them away from business for from eight to ten days. Then atropine frequently produced toxic symptoms which made it necessary to discontinue its use. So that when homatropine was introduced I hailed it with delight and seized upon it at once, and the experimental results which I carried on at a large clinic at the City Hospital and in my private practice—of all of which work I kept records—enabled me to satisfy myself of the usefulness of this drug. But the solution must be made fresh every day. I find it deteriorates rapidly not in its capacity to dilate the pupil, but to produce suspension of accommodation. I do not wait forty or forty-five minutes after the instillation, but only thirty minutes. Sometimes I have the instillation made a third time, but the accommodation usually succumbs to one or two instillations of

homatropine and inasmuch as it produces no unpleasant symptoms I value it very highly. I have no respect for solutions that are found on the market.

Now as to the value of the Javal-Schioetz instrument. Dr. Edward Jackson, of Philadelphia, maintains that in 16 per cent. of the cases the total astigmatism is revealed by the ophthalmometer in its most improved form. It is a time-saving machine—it measures with approximate accuracy the different curvatures of the cornea, but the different curvatures of the cornea have very little relation to total astigmatism of the eye and since it is for the purpose of correcting the total refraction we must not busy ourselves with those nice little attempts at measuring the curves of the surface of one of the reflecting areas, but take the whole thing. Now 16 per cent. is a very small amount of success. I have hypermetropic astigmatism myself of $\frac{1}{12}$, and yet for a long time under the action of the sulphate of atropine I went under the impression that I had only $\frac{1}{20}$. Now $\frac{1}{12}$ is about $3\frac{1}{2}$ diopters and $\frac{1}{20}$ is about 2 diopters, that is the difference. With atropine I did not have a complete suspension of accommodation, but the glasses were such a vast improvement upon nothing that I toiled on, and I have not required a spherical lens at all. I really supposed that I required $\frac{1}{12}$ to correct my astigmatism until I made the test with homatropine. Now another point, it is not necessary to correct this wholly, nor is it necessary to use glasses all the time. The skiascope test is exceedingly nice; it is scientific, and approximately accurate results are obtained by those who have time to work with it. But homatropine is better. Just as I said in my own case, before the use of homatropine I was under the impression I had only $\frac{1}{20}$, and under a complete suspension of accommodation it turned out that my astigmatism is plus $\frac{1}{12}$ and I use a minus glass when I go on the street. I am 54 years of age, still I can not go out on the street and see distant objects with a $+\frac{1}{12}$ glass, but I wear just half that amount, $-\frac{1}{24}$. I know this is opposed to the teaching and dictum of our masters in the profession.

DR. TIFFANY.—Do I understand you to use minus glasses for distant objects?

DR. REYNOLDS.—I am looking at you through a minus $\frac{1}{24}$.

DR. TIFFANY.—Without a plus glass.

DR. REYNOLDS.—No plus glass at all.

DR. TIFFANY.—It seems to me that it is probably more of a mixed astigmatism; that is that he now has presbyopia and so does not need a concave glass for near objects.

DR. REYNOLDS.—I have no presbyopia. I would like to have you examine me.

DR. TIFFANY.—I would like to ask Dr. Reynolds if he treats his patients in the same manner? If, when he finds plus astigmatism, he gives a minus glass?

DR. REYNOLDS.—If it is of high grade I do, yes.

DR. DRIVER.—I would like to ask the Doctor this question: Say we have a case of compound hypermetropic astigmatism, does he correct the hypermetropia with the astigmatism? Say you have + 2.0 D. with + 1 D. cylindrical, do you correct it for distance and for reading?

DR. REYNOLDS.—Such cases do not generally require glasses for distance. People of course vary in that respect; some of them will require correction for the street. I recall now a case of a man who wears a plus lens for distance and has ordinarily no use for a cylindrical lens, but when he reads he requires a full compound lens.,

ARGENTAMIN IN OPHTHALMICS.

Hoor has recommended argentamin as a substitute for silver nitrate in eye affections where the latter is indicated. Argentamin is chemically ethylenediamin-silver-phosphate. Unlike silver nitrate, which when crystalline, is acid in reaction, and when fused neutral in reaction, argentamin is alkaline, and this accounts for the fact that its application causes only slight and transient local reaction, a point much in its favor. It never gives rise to a deposit on the abraded or ulcerated cornea, which nitrate of silver sometimes does, nor to the staining of the conjunctiva, nor to the disagreeable metallic taste associated with the use of the latter. It may be used in 3 or 5 per cent. watery solution, once or twice a day, or oftener if required. It seems to have all the advantages and none of the disadvantages of silver nitrate.—*British Medical Journal.*

CLINICAL MEMORANDA.

OCCURRING IN THE PRACTICE OF DRS. ALLPORT
AND TODD.

BY FRANK C. TODD, M.D., MINNEAPOLIS, MINN.

A CASE ILLUSTRATING THE EFFICACY OF SUB- CONJUNCTIVAL INJECTIONS.

MRS. S., age, 50 years, a woman of vigorous healthi was struck in the eye with the edge of a newspaper. The cornea became clouded and within thirty-six hours a corneal ulcer developed. The patient used hot applications for a few days, but the symptoms becoming more pronounced, she called her family physician, who diagnosed kerato-iritis, and prescribed in addition to the hot applications, a solution cantain-ing atropine, cocaine, and boracic acid. Mercury and potas-sium iodide were given internally. She was kept in a dark room and her bowels and diet regulated.

Her eye becoming worse, Dr. Allport was called, and found the patient suffering agonizing pain, uncontrolled by morphine and other anodynes, and afflicted with insomnia, anorexia and intense nervous demoralization. There was ulcerative and diffuse keratitis, iritis with posterior adhesions, beginning hypopyon, contracted pupil, circum-corneal injection and cyclitis. Beneath the epithelium of the cornea there was an extravasation of blood giving the appearance of a bulla. Her stomach would no longer tolerate mercury and potassium iodide, and they with the hot applications were discontinued. Ten grains of sulphonah, to be taken at night, was prescribed. Three ounces of blood was extracted from the temple, a strong atropine solution was instilled, one-half a drachm of a freshly sterilized one per cent. solution of sodium chloride was in-

jected sub-conjunctivally, the eye bandaged and the patient told to keep quiet in a dark room. She returned next day a new woman, having slept all night absolutely free from pain and was in good spirits.

The incipient hypopyon had disappeared, likewise the iritic adhesions, and the pupil was dilated. In every way the eye appeared much better. The same treatment was, in the main, sustained until the end, the temple being cupped once more at intervals of three days, and two more sub-conjunctival injections used. The patient suffered no more pain, and uninterrupted recovery followed.

The chief credit for the pronounced improvement must be given to the sub-conjunctival injections.

A CASE IN WHICH SUB-CONJUNCTIVAL INJECTIONS WERE NOT EFFICIENT.

MR. H. N., age, 18 years. Caught cold in left eye, and developed iritis. His family physician dilated the pupil with atropine and prescribed hot applications, which was followed by improvement until the patient, desiring to save expense, ceased the atropine, when tough adhesions formed and inflammation increased. When he presented himself for treatment the cornea was ulcerated and hazy, the iris inflamed and the pupil occluded. No dilatation could be obtained. Three ounces of blood was extracted from the temple at intervals of three days on three occasions, mercurial inunctions and potassium iodide prescribed, the patient kept in a dark room, one-half a drachm of a one per cent. solution of sodium chloride was injected sub-conjunctivally, and repeated in three days. As only transitory improvement followed, five drops of a $\frac{1}{2000}$ solution of mercury bichloride was substituted for the salt solution, and repeated several times on subsequent days. Paracentesis was performed four times decreasing tension, and relieving pain each time. Iridectomy was advised, but the boy was unwilling and his parents too far away to give consent. As nothing seemed to be curative, the atropine only aggravating the inflamed iris, and the injections not beneficial, all treatment excepting the potassium iodide and mercury was

discontinued. Inflammation gradually subsided, leaving an occluded pupil and leucomatous cornea.

A CASE OF NOCTURNAL EPILEPTIFORM CONVULSIONS RELIEVED BY CONTROLLING A SPASM OF ACCOMMODATION.

PATIENT, J. D., age, 10 years. Referred by City Physician. Diagnosis: Epilepsy. Symptoms: Frontal headache and dizziness. The convulsions were nocturnal, and had occurred nearly every night for two weeks, coming on after the patient had fallen asleep. The attacks were ushered in by extreme restlessness and unconsciousness. Violent muscular contractions, frothing at the mouth, and other epileptic symptoms followed. Patient was anæmic and lethargic, though previous to this trouble he had enjoyed good health. Examination without cycloplegic. $V. = 10/cc^{-20}/_{XL}$ W. — 1.50 s., both eyes. After daily atropine instillations for one week examination revealed $V. = 20/_{LXX}^{-20}/_{XXX}$ W. — 1.25 s. $\bigcirc + 0.50$ cyl. ax. 90° .

This latter correction was prescribed and atropine used for a month. After the first use of atropine the patient was relieved of all his symptoms, slept well and had no more convulsions. A relapse may occur, but such is not probable, for it seems evident that the convulsions were due to eye strain.

A PIECE OF STEEL IN THE VITREOUS LOCATED BY OPHTHALMOSCOPY AND REMOVED WITH THE ELECTRO-MAGNET.

PATIENT, T. D., age, 21 years. Consulted Dr. Allport January 14, 1897. One hour previous, while rimming a screw-hole with a chisel, a piece of the chisel had chipped off and darted into the patient's eye.

Inspection showed a rupture of the ocular conjunctiva and sclera, one centimeter external to the margin, and just inferior to the longitudinal axis of the cornea. Ophthalmoscopic examination revealed a clear aqueous and lens, a somewhat hazy

vitreous, numerous ruptures of the choroid near the point of entrance of the foreign body, and a rupture on the nasal side of the disc. Just inferior to the immediate rupture a glistening body could be seen, and this location was carefully noted.

The operation took place at the hospital within a half hour. Under cocaine anæsthesia, the point of a electro-magnet was introduced through the rupture in the globe, and directed toward the location already determined. That the foreign body had been correctly located, was proved by the click heard as soon as the point was introduced and it only remained to withdraw the magnet to which the piece of steel adhered, and insert one suture to complete the operation. There was no escape of vitreous, and the wound quickly healed. The patient was kept on his back for two weeks, and most of the time for a month.

There is now an extensive retinal detachment, but the nasal fundus is still capable of receiving impressions. The piece of steel is wedge-shaped, has jagged edges, and measured one-quarter of an inch in diameter.

THE RÖENTGEN RAY.—Dr. E. Bock, in *Memorabilien* (February), suggests that if letters are painted on a sheet of card-board, afterwards varnished and dusted with powder of metal, or the letters are made as gold leaf is applied, the Röntgen rays will throw their shadow through the opaque cornea of the blind, and if the optic nerve is still sound, the blind person will see the shadowgraph thrown on the retina. He urges experts to experiment in this line with persons who have lost their sight from opacity of the cornea, etc., and quotes Prof. Eder, of Vienna, as authority for its feasibility. *Journal of the American Medical Association.*

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

JUNE, 1897.

NO. 6.

ORIGINAL ARTICLES.

BLEPHAROPLASTY.

BY CHAS. H. BEARD, M.D., CHICAGO, ILL.,

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OLD, as is plastic surgery of the eyelids, and familiar as are most oculists with the various operative principles of this branch of the art, there is, in general, a singular disregard both of the possibilities and the opportunities here offered. While it is true that there is hardly an operator but who has essayed more or less in this line, relatively few have been persistent and painstaking. These two words are suggestive at once of the causes of the greatest number of successes, and of the reasons for nearly all of the failures. Aside from these considerations, results good or bad seem to hinge largely upon the matter of personal equation,—it is like the art of mechanics, some men are minus the aptitude. Others, again, have an actual aversion for the making of such operations, though one is led to suspect that it is apt to be an aversion born of disappointment.

Because the writer has been afforded rather an extended experience in this department of surgery, has been fairly persevering and observant, has endeavored to refine down and simplify detail and technique, that he presumes to offer this article, hoping thereby to furnish a timely hint or two to those

of his colleagues who may have been denied similar personal trial.

In this country blepharoplasty is oftenest undertaken for the relief of entropion and trichiasis resulting from trachoma; next, in frequency, for ectropion following burns, ulcers and other injuries. After these, perhaps, come those plastic operations which ordinarily attend the removal of neoplasms of the lids. I shall attempt, therefore, to describe methods of procedure, which in the several conditions above mentioned, viz., entropion with trichiasis, ectropion and neoplasms, have stood me in most excellent stead.

ENTROPION WITH TRICHIASIS.

Especial reference is made to that form which is due to chronic trachoma, or old granulated lids. Since these operations have for their chief object the correction of defects and deformities of the lids caused by destruction or lack of certain tissues, the great desideratum is usually the borrowing of suitable tissues with which to supply the want. Where such entropion exists, it is the conjunctiva that is deficient, and one needs to put the new tissue *within* the lines of cilia. Mucous membrane of the lower lip, *inside* of the mouth, makes the handiest and most fitting substitute.

Those afflicted with this malady come to us of every age, between that of the mere child of ten to fourteen years, and that of the septuagenarian, and with every degree of the deformity, from the incipiens incurvation, where only a few cilia touch the cornea, to that exaggerated condition where all the lashes of all four of the lids rest upon the globes. We are to be governed then in what we undertake not alone by the severity of the case, but also by the age of the patient.

While progressive atrophy of the conjunctiva, and of the tarsus is in a great measure responsible for the trouble, these factors alone can not account for the absence of the free borders, or feathering down of the normal thickness of the edges of the lids, which is present in all these cases. This unquestionably, is a result, mainly, of the prolonged blepharospasm or over-tension of the palpebral portion—and particularly of that of the border fibres of the orbicularis muscle, so characteristic of the disease in question. Chief then, among the ends

to be accomplished, in dealing with the defect, must be our aim to replace the tissues destroyed by the atrophic processes and to relieve the lid-tension. Now, the usual means employed for the purposes in question are trite enough, and were they usually effective, that is to say, permanently effective, my story were already at an end. But the customary and stereotyped means, according to my observation and experience, are not sufficient. All operators get beautiful results, but do they last? It is safe to affirm that they are, in the majority of instances, but brief—or at most, only temporary. As I said, many of our entropion patients are young persons, with their lives before them, and in order to make their relief enduring, it is necessary to replace one deformity by an opposite one; in other words, turn an entropion into an ectropion. Presumably it is possible to get too great an over-effect, but, as a matter of fact, this would seem to be a myth. One sees every day the folly of too little effect, but never a mistake in the other direction. No matter then, how slight the distortion of the lid, nothing short of excessive immediate effect will suffice.

Assuming, for example, that we have before us a marked entropion of the upper lid to correct, we proceed as follows: First, with strong, straight scissors, and with a single snip, a free external canthotomy is made, then the upper lid is grasped between the finger and thumb and pulled outward, making taut the external canthal ligament; the scissors are introduced at the wound, and this ligament is boldly incised, so that the lid is felt to give way. The lid is everted, and while being held so by the finger-tips placed on the lashes, or where the lashes should be, a deep incision is made just behind the follicles of the cilia, and hugging more the conjunctiva than the tarsus, and extending from as near as practicable to the punctum to the outer end of the tarsus. For this purpose I have had made a scalpel with an enormous convexity of edge, or belly, near its point. This incision should not extend into the tarsus, but should lie rather between the latter and the conjunctiva, as it were, and should have a depth, in the middle, of about 3 or 4 mm., and then be laid open, or made to gape, to its utmost extent. Then the lid is turned down and while its hæmorrhage is stanching, we pass to the next steps of the operation, viz., a slight modification of the excellent operation devised by Dr. Hotz, of this city, combined with a counter-

grooving of the tarsus. A broad hard-rubber spatula is inserted beneath the lid and its end pushed up in the upper fornix of the conjunctiva, and held there by an assistant. With the same extra-convex scalpel, an incision is made through the integument and through the underlying orbicularis muscle, *usually not over 4 mm. from the free border,—sometimes less, as when the tarsus is greatly atrophied,*¹ and extending somewhat beyond the line of the canthus at either end. The lower flap of this incision, with its portion of the orbicularis, is now dissected up, denuding the tarsus, *clean down to the point where the cilia are seen to cross, like stitches in a seam,* the bottom of the incision, or the pocket thus formed, taking great care not to button-hole through. For this it is best to use the point of the scalpel with the edge turned backward, an assistant meanwhile pushing up the brow with the thumb. The dissection being complete the full length of the tarsus, catch hold, with mouse-tooth forceps, of the muscle contained in the lower flap at one end of the incision, and excise the whole of it by means of blunt-pointed, curved scissors. Now re-insert the spatula and cut a wedge-shaped groove in the middle of the tarsus, nearly its entire length. After this, introduce the sutures to complete the Hotz operation. The needles should be about an inch long, of the half-curve variety, and the thread No. 3 black, braided silk. Three to four sutures, owing to the length of the tarsus, are employed. The needle is first passed through the lower flap, taking a good deep bite, *then carried just beyond the upper border of the tarsus, and dipped in and out through the deep fascia that serves as the ligament of the tarsus, thence well up beneath the upper flap,* which is lightly dissected back for the purpose, *and out through the skin about half way up to the supercilia.* Next, the tying of the sutures; and here the closest attention to the detail of every manœuvre is of the very greatest moment. Clean all of the fibrin out of the incision back of the cilia, and from beneath the flaps over the tarsus. The lower flap must be free to slide over the tarsus, in tightening the sutures, so as to strut the cilia upwards like the tail of a peacock, which it could not do if glued tightly down

¹Those portions of the description of this operation printed in italics refer to features which were, to the best of my knowledge and belief, first practiced by me, and constitute the modification alluded to.

by fibrin. Tie the central sutures first. *Make the double turn in one thread then give the lower end to the assistant, catch hold of the edge of the lower flap with the forceps, place it beneath the edge of the upper flap, and turn it down in contact with the ligament of the tarsus, just where it is pierced by the second dip of the thread, simply tucking back the upper flap, edge inward; push downward with the ends of the forceps, (or have an assistant do so with a probe), on the tarsus to be sure that it breaks with its convexity downwards, closing up the newly-made groove; and now, operator and assistant pull together on the ends of thread and draw it tight. Were the tarsus not pressed down in its middle, it might bend the wrong way—i. e., with its concavity downwards, and thus increase the very deformity it was the aim to correct.* If all has gone well, the free border is now directed upwards, and the incision made behind the cilia is widely yawning. Prepare the lower lip, grasp it with finger and thumb of left hand, roll it tightly over the ball of the middle finger, and, with one snip of the long-bladed, strong, straight scissors, excise an ellipse of mucous membrane sufficient to fill completely the cut back of the lashes; drop it in 4% boric acid solution at about 110° F., take it out and turn it face down on the left thumb-nail, trim off, with scissors, the bunches of adipose tissue, and place it nicely in the cut absorbing all oozing and moisture about with bits of cotton well wrung out of boric acid solution. Do not suture it, for it will cling as if by instinct. Lastly, stitch the conjunctiva to the integument as the finishing touch to the canthoplasty as well as to the whole operation. The dressing consists of a thin sheet of absorbent cotton, next to the eye, wet with warm 4 per cent. boric acid solution, each ounce of which contains about a drachm of sterilized glycerine, added for its hygroscopic effect; a good-sized pad of dry cotton, and a mosquito-net roller applied wet. The dressing is removed at the end of forty-eight hours and reapplied, after which daily for at least ten days to two weeks. I have learned not to leave off the bandage earlier, for the reason that I saw two or three of the mucous grafts perish from sheer drying up before adopting the longer bandaging. Even after the bandage has been discontinued, the grafts should, for a time, be kept greased with sterilized vaseline.

In my practice, all four of the above described operative features, canthoplasty, Hotz operation, counter-grooving of

tarsus, and post-cilia mucous graft, are nearly always combined in the one sitting, which has come to be known as the Eye and Ear Infirmary, *à la* Trilby, as "the all-together." They are thus combined not for convenience, but because experience has taught that, by so doing, the effect is greater, better, and more lasting. If all were done piece-meal, *i. e.*, for instance, the canthoplasty to-day, the Hotz next week, the grafting the week after, and so on, the ultimate result would most likely be poor or *nil*.

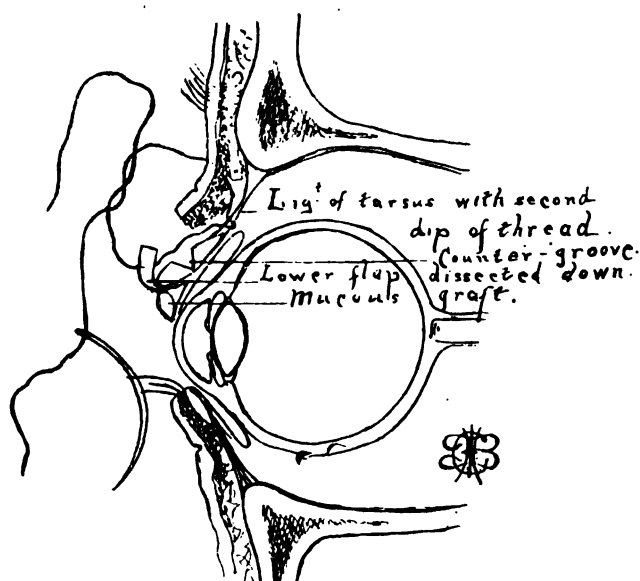


Fig. 1.

Skin-grafts for the restoration of the free border I have long since abandoned, though many claim that they are just as good as those of mucous membrane. The last bit of skin I made use of in this connection was one I put into the border of the lower lid, and which rested directly upon the cornea. Very shortly an ugly ulcer appeared on the cornea immediately under the graft. No hairs could be found in the piece to cause the irritation, but it was observed that, while all the rest of the lining of the lid was constantly moist, the graft itself remained dry; and it was only by the excision of the bor-

rowed tissue, and the substitution of a mucous graft from the lip that we were able to cause healing of the ulcer.

The accompanying sectional drawing, Fig. 1, will serve, at a glance, to illustrate the above described methods. Figures 2 and 3 show a pronounced case of entropion just before, and ten days after, the operation.



FIG. 2.

"The "all-together" is not required for the lower lids, the grafts alone being commonly quite adequate.



FIG. 3.

With regard to the other varieties of blepharoplasty referred to at the outset, I must try to be more concise, having already occupied too much valuable space.

Like all the other departments of medicine, that of blepharoplastic surgery is over burdened with an elaboration of names and synonomous terms. Inasmuch as the essential object in those operations is the restitution of missing parts, the names and terms have reference to the originator and the quality of the borrowed tissue; hence, we have in early times the Branca family of Italian surgeons, Fricke, Blasius, Dieffenbach, Desmarres, etc. And more recently Arlt, Lawson, Wolf, Reverdin, Ollier and Thiersch. We have autoplasty, heteroplasty, transplantation and transportation. It may be said in passing that one may, on occasion, serve one's self well with most any of the different methods. But, simplified, and made to conform to more modern ways of doing, the *terms* may be reduced to two,—graft, meaning either skin, epidermis, or mucous, when bodily lifted and transferred to another place; and *flap*, when not entirely removed from its proper site. In the matter of skin-grafts, three names are useful in designating the kind—Reverdin, when they consist of small islands of epidermis; Thiersch, when they are of larger size; and Wolf, when the whole thickness is meant.

I have learned to employ grafts in most all cases of restoration of the lid, as the resulting scar whence the piece is taken, is out of sight, whereas, in resorting to sliding flaps, the cicatrices about the eyes are multiplied. Of the three kinds of graft those named for Wolf are by far the most valid and satisfactory for blepharoplasty of the integument. When taken from the inner aspect of the upper arm their thickness seems just right, and with care and cleanliness they may be cut of great size, with good assurance that they will survive. Their proneness to shrink and shrink, however, is often forgotten, and thus many failures arise. To replace the lower lids in the case shown in Figures 4 and 5, for example, where the areas to be supplied measured each about one inch in length by about a half inch in breadth, I cut from each arm a graft $2\frac{1}{2}$ " by $1\frac{1}{2}$ ". The second picture was taken two weeks after the operation and shows the lids still pushed high up on the eyes. Ultimately though, they will drop down enough. Over-effect is just as desirable,—yea, as imperative,—in ectropion as it is in entropion.

Now, and then, where there has been extensive destruction of the lids, and the system of restoration is of necessity

complicated, especially where there is plenty of available integument in close proximity, sliding flaps are of the greatest advantage. Such was the case in Fig. 6, where an epithelioma had destroyed the whole of the lower lid, the outer third of the



FIG. 4.

upper, the external canthus, and a good portion of the ocular conjunctiva. Here, after removing all of the growth, I slid in, from the cheek, an immense mitten-shaped flap, with a broad



FIG. 5.

pedicle, stitching it externally to the skin and internally to the conjunctiva. The photograph was taken about two years after

the operation. This patient has perfect control of the movements of the lids.

Thiersch grafts I have found serviceable only when a part has been left devoid of epidermis, and likely to leave too much of a scar on healing. This happened, for instance, at the widest part of the "mitten" just alluded to, where the skin of the cheek could not be approximated. When it was nicely granulating, I applied a large epithelial graft with happy consequences.



FIG. 6.

A few general considerations, and then I will close. The absolute cleanliness of parts, hands, instruments and thread is indispensable, goes without saying. I find that some men who are exacting enough in all the other of these particulars will neglect their thread; yet it is around this that infection, when it occurs, is usually first seen. As to the antiseptic chosen, I rely mainly on fresh 4 per cent. boric acid solution, made with newly boiled distilled water, used very warm, for the irrigation, immersion of the grafts, and all. I avoid, as much as possible, the use of fixation or other forceps in handling the grafts and flaps, for they chew and maim. The fingers, whenever feasible, are infinitely superior.

OPHTHALMOLOGICAL TESTIMONY IN A MEDICO-LEGAL CASE.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU; C. & M. V.; B. Z. & C. RYS.; CITY HOSPITAL, ETC.

THE plaintiff in the damage case of A. Hartsough *versus* J. Stitt and J. W. Frazier, of Frazeyburg, Ohio, came to my office for examination of his eyes May 11, 1897.

Examination revealed the following history: December 25, 1895, was working in a well and about twenty feet from the surface of the ground. Stitt was lowering into the well a forty-pound tile, when the rope broke and the tile fell striking plaintiff on top of the head. He was not unconscious but very much dazed, and after being taken from the well walked a short distance to the house and became sick at the stomach and very weak. He had to stay in bed for several days and suffered from nausea and vomiting, but was not unconscious. After this he got up and walked about but was very weak and soon began to lose flesh (he has lost forty pounds), and says he has not been able to work. He does not have to get up at night to urinate and urination is normal in frequency in daytime. He has no rheumatism; does not drink, and never had venereal disease. He has suffered from malaria considerably in his lifetime. There is no insanity in the family.

EXAMINATION OF EYES.—Pupil reflexes, both direct reflex and consensual reflex to light, as well as accommodative reflex normal. No ptosis, nor paresis of ocular muscles. Visual fields in both eyes to colors concentrically restricted, left worse than right. Ophthalmoscopic examination: R. E., media normal. Outer half of disc slightly pale, inner half hazy. Disc shows marked atrophic cupping in outer half. Veins enlarged and tortuous. Arteries about normal. No haziness of retina. L. E., disc very pale and shows atrophic cupping. Inner half very hazy and outer half very pale. Veins enlarged and tortuous. Arteries somewhat diminished in calibre. No haziness of retina. Tension normal, both. Skiascopy shows + 1 D. s., each eye. Vision: R. E., + 1 s. = $\frac{6}{x}$; L. E., the same. V. = $\frac{6}{11}$.

INJURY TO HEAD.—Has deep scalp wound about two inches long, crescentic in shape and points of crescent pointing forward. I can not detect any fracture or depression of the bone. The wound is on the vertex at the junction of the occipital and the inter-parietal sutures.

SYMPTOMS.—Stands with feet together and eyes closed. Walks with great difficulty in a straight line with eyes closed. Knee-jerks normal. No locomotor ataxia. Does not scan speech; no nystagmus. In carrying a glass of water to his lips with the left hand marked tremor occurs, but this does not occur when the right hand is used. (Symptom of Charcot's disease—disseminated sclerosis).

ÆSTHESIOMETRY.—All points normal, save palm of right hand, which at six lines and at less distance than six lines, feels three points instead of two. Right cheek feels three points at five lines and two points at eight lines. Left hand normal. Right side of forehead three points at ten lines. Left forehead normal. This peculiar anæsthesia shows lesion to sensation at the base of the brain. (See DaCosta's Diagnosis, page 64).

Muscular sense, right hand impaired. It is my opinion that this is a case of Charcot's disease (disseminated sclerosis) in its early stage. It is probable that there are several small spots of sclerosis in the left cortical sensation centers or involving the radiations from these centers. There is also, probably, a spot of sclerosis in the right side affecting the left arm.

No mind-blindness, word-blindness, epilepsy, etc. No paralysis. Slight optic atrophy, result of optic neuritis, occurring with meningitis, following the result of the injury to head.

Examination of urine showed sp. gr. 1023, no albumen, no sugar or excess of urates. Ureometer shows 2.2 per cent. urea or normal, showing no disease of kidney or rheumatism. Rheumatism tests, negative.

All of these facts were stated before the jury by the writer.

COUNSEL PROS.—State how blow on head affected this man's brain?

ANS.—By causing a subacute meningitis which subsided and left small spots of adhesion in meninges causing hardening at such points. The tunics of eye being continuous with

those of brain the meningitis extended into the optic sheath and thus affected the optic nerves.

QUESTION PROS.—You think, then, that the disease of this man's brain was due to the injury received?

ANS.—Yes, sir.

QUES.—Do you think chronic malarial poisoning could have caused this man's brain disease?

ANS.—No, sir.

QUES.—Do you attribute his great loss of flesh, since the injury, to brain disease?

ANS.—I do. I can find no evidence of chronic malarial poisoning.

* * *

The suit was for \$10,000 damages and the jury returned a verdict for \$2,000. The jury held that Stitt, the man who lowered the tile, was in no wise responsible, but their opinion was that Frazier (the owner of the farm), had been negligent in using a defective rope, and accordingly they assessed \$2,000 damages against him.

SOME OBSERVATIONS UPON THE IRRITATING EFFECTS OF THE NATURAL GAS UPON TRACHOMA.¹

BY JOHN J. KYLE, M.D., MARION, IND.

I DESIRE, in a general, way to call attention to the irritating effects of the natural gas upon the conjunctiva, with special reference to its effect in the production of trachoma.

The Indiana gas belt covers a territory, approximately of 2,500 square miles, with a population of 300,000. The general characteristics of the natural gas are its combustibility and chemical destructibility. The atmosphere is constantly permeated with the gas. In consequence delicate fabrics, draperies, wall paper, books, leather, upholstery, surgical instruments,

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

metallic instruments of all kinds are destroyed or tarnished. To our great annoyance, the gas seems to have a special predilection for politzer bags.

Eminent chemists disagree regarding the relative constituents of natural gas. The most trustworthy is from the last report of Mr. J. C. Laach, Natural Gas Inspector of Indiana, and is as follows:

Carbon,	-	-	-	70.25
Hydrogen,	-	-	-	21.45
Sulphuretted Hydrogen,				.17
Carbonic Acid,	-	-		.02
Nitrogen,	-	-	-	7.95 (by difference)

100.

Eighty-five per cent. of natural gas is marsh gas which is composed of 75 per cent., by weight, of carbon and 25 per cent hydrogen.

The burnt gas which we will have occasion to refer to, is composed of carbon dioxide, nitrogen oxides, sulphur dioxides and trioxide, and water, the relative amount of each constituent is governed by the combustion, differing in every case.

It will take but a brief stay in the gas belt to convince one of the singular irritating effect of the gas. During the winter months, on account of the cheapness of the fuel, there is a great tendency to over-heating and bad ventilation, not alone this, but the escaping, burnt gas from stoves and jets fills the atmosphere, thus producing a carbonic acid poisoning. It has been my observation, that in all cases of conjunctival inflammation which respond but reluctantly to every form of treatment, and in spite of every effort to combat the disease, the condemning of jets and substitution of lamps have in every case, after a short time, shown marked evidence of benefit. The products from imperfect combustion from jets is the potent factor in stimulating the growth of this disease. In many cases where sleeping apartments are for any length of time illuminated, eyelids, otherwise normal, upon awakening, are swollen and congested, due more especially to the local irritation in the nose and throat, which are in acute cases found dry and swollen with scanty secretion. When electric lights are substituted a change is at once noted. This is a common oc-

currence. I have personally experienced it. After a time the tissues seemingly adjust themselves to the change, and return to a normal condition. This adjustment may take weeks or months, or they may possibly never become free from irritation.

The population of this city, Marion, Ind., and immediate region, is cosmopolitan, being made up of native people and immigrants from Eastern States,—Belgians, French, Welsh, Indians and a very large settlement of negroes.

Dr. Burnett's valuable researches have established the peculiar immunity of the negro race, as well as the geographical distribution of this disease. In regard to the Indians, so far among seven hundred, all civilized, I have failed to see or hear of a single case. This will not apply to the Indians of the Northwest, where all forms of eye-disease develop very prolifically.

Throughout this region of Indiana, the native people are the ones most susceptible to this disease. Among twenty-five cases under observation during the year 1896, all were native born. The disease was not confined to one locality, occupation or station in life. In two cases the disease was monocular.

The balance of proof is yet in favor of the disease being contagious and infections, due to the trachoma coccus, so named by Michel, of Germany. Among those who advocate such theory are Fuchs, Meyer, De Wecker, Berry, and in this country, Holt, of Portland, Me.; Randolph, of Baltimore; Cullen, of New York; Ray, of Louisville; Savage, of Nashville. (From "Racial and Geographical Distribution of Trachoma in America," by Burnett, in *AMERICAN JOURNAL OF OPHTHALMOLOGY*).

On the other hand, Burnett, Blauw, Forester, and many others deny the contagiousness of the disease.

I believe in the "transportation from person to person as proven by Schmidt-Rimpler in Hesse." This may result from direct infection or through the air. Whole families under observation have become inoculated,—father, mother and six children. In one other case, mother and three children, and so on. They all show the characteristic conjunctival cicatrization.

I recognize two distinct stages of the disease, acute and chronic; I do not believe that the cicatricial stage of the disease is a subdivision of trachoma. To my mind it is rather the sequela of the second or chronic stage. When scar tissue

takes the place of granulation the disease becomes anatomically and pathologically a new disease — "cicatricial conjunctivitis."

We recognize a clinical difference between trachoma and follicular conjunctivitis. In this latter we have "tumefied lymph follicles" appearing only on the lower lid, about the size of a pin head, transparent and vascular, arranged in rows parallel to lid margin. Furthermore, cicatricial change is not a pathognomonic sign of pre-existing trachoma.

The disease may be treated and cured without leaving signs behind, such results occur only when patient is seen early and granulations are few. Spontaneous recoveries are reported. The tendency, however, of each granulation is to leave a scar, due to shrinking of conjunctiva.

In our many surgical methods, scissors, grattage, expression, or expression by forceps, the utmost care is necessary.

Dr. Greef (*Archives of Ophthalmology*) very aptly portrays the ill result when he says: "We saw several times in out-clinic cases which have been operated upon (Heisrath method) in this manner at Königsberg exhibiting the saddest sight imaginable."

The ultimate recovery of patients depends upon careful treatment, cicatricial change resulting as a rule; it is necessary, therefore, to avoid adding a tendency to such a condition.

The first step in the treatment should be the correction of any interference with the perfect drainage of conjunctiva. If there be any occlusion or inflammation of the duct, it should be divided and thoroughly syringed with a mild alkaline solution, thus restoring and keeping up a healthy condition.

One-half per cent. solution of pure iodine crystals in alboline (after Nesnamow) brushing on the conjunctiva, after thorough cleansing, to us has brought very satisfactory results.

Briefly, then, my treatment is as follows:

1. Careful attention to drainage.
2. Cleanliness, attention to nutrition and ventilation of apartments. The substitution of lamps for jets.
3. Complete removal of adenoid tissue by surgical methods.
4. Careful washing of the conjunctiva with sol. bichloride (1-5000) followed by application of iodine solution with massage as an adjunct.

5. The occasional use of the stick of sulphate of copper.

DISCUSSION.

DR. CORR.—I wish to indorse the sentiments of the paper so far as the "gas belt" irritation is concerned. But I believe the doctrine that trachoma is a disease of its own kind and can be communicated from one to another is a heresy from beginning to end. It is a complicated disease growing out of an anatomical condition of the parts; any simple so-called catarrh of the conjunctiva or an irritation of that kind can produce it by prolonged influence. I am aware that what I am saying is in the face of almost all the authorities in this country and a large part of the English, but I have not been able to find, from the clinical facts which have come to me, that the disease is a disease of its own kind, nor do I think it is of a contagious character. The pathology, I think, can be accounted for on a different theory from that of the presence of a microbe. I think the larger part of the so-called epidemics of this trouble are due to a condition of things entirely independent of the idea that it is contagious. I have seen a number of whole families with the disease and the strange point was that none of them had any inflammation of the lids, but they all gave long-standing irritation of the eyes as a possible cause. Possibly, then, the trouble arises from some defect of ventilation in the sleeping apartments or something of a similar nature. I have seen the disease occur in an institution where there were a number of children occupying sleeping apartments that were very small. I think we can satisfactorily account for it in this and similar ways.

DR. REYLING.—I wish to say in regard to the histology and bacteriology of trachoma, that it is really due to a diplococcus. Dr. Byron has made a number of cultures in the Loomis laboratory, and after making the cultures he inoculated patients and produced trachoma. All irritating vapors and also powders have a tendency to make trachoma worse and any irritating kind of food, as salt meat, and highly seasoned food will aggravate trachoma. I have had a chance to find out by sending cases that were living in poor and badly ventilated apartments to the hospital where they received good food and pure air, and in a couple of weeks the disease had

improved. To be sure, they have not got well in three or four months, but they have greatly improved as soon as they got good food and pure air. About the treatment, this must be varied, according to the condition or variety of the trachoma. In acute cases, where there is a certain amount of muco-purulent discharge, the best treatment is to apply a weak solution of nitrate of silver, say about five to ten grains to the ounce, then neutralize that with a salt solution. Apply that once a day and besides that order some mild washes. For the chronic cases we have different methods. We have one variety which looks like follicular conjunctivitis, in which the granulations are very small. We find the upper and lower eyelids are yellowish in color. For that variety the best treatment is to use 3 ij of tannic acid to 3 j of glycerine, applied once a day. Then the patient should apply to the eyes a weaker solution of ten grains to the ounce three times a day. I have succeeded in curing in three or four weeks cases of this form. In cases where the granulations are larger, we should use Dr. Knapp's or the forceps of Dr. Noyes', and remove the granulations. If the work is carefully done you will have no scar tissue or a very slight amount of scar tissue afterwards. This must be done thoroughly and carefully. Another variety is called trachoma which is not really a true trachoma and is due to a hypertrophied rhinitis. For this form of the trouble the chief treatment is to remove the cause which is the hypertrophied rhinitis.

DR. WHEELOCK.—The diplococcus which causes this trouble no doubt exists, and so far but little progress has been made in destroying it. I have tried a little method which has served me pretty well in many cases and that is by the sub-mucous injection of a neutral salt solution. I have had many cases in which there was repeated occurrence of the disease, and in that class of cases I find the sub-mucous injection or infiltration of the tissue by a neutral salt solution will produce an extensive swelling of the membrane, and by then painting this thoroughly with various solutions you get a more complete effect.

DR. BULSON.—I would like to ask Dr. Corr if I understood him to say that he did not think trachoma was transmissible?

DR. CORR.—Not as trachoma.

DR. BULSON —My experience has been different. I am satisfied that we find what I call typical trachoma spreading by direct transmission. We have at Fort Wayne an Orphan Asylum in which there are confined 160 or 175 children. A child with acute trachoma was taken to that Institution and not long afterwards others of the children were infected. These children were kept in a very cleanly condition, well fed, well clothed, their apartments were light and airy, the surroundings were healthful, and as good as could be obtained. As I say, two or three weeks following the committment of this child, four or five cases of trachoma started. I informed the nurses that it would probably run through the school unless the utmost precaution was taken. They replied that they could not quarantine them, and could not take care of them as they ought owing to the fact that they had insufficient help. I told them they would have to take the consequences. It did go through the school till we had 160 cases. This occurred, to my knowledge, directly from this one case introduced into the Asylum. I have only a few words to say in regard to the treatment. I am a strong advocate of the use of nitrate of silver, especially when there is an abundance of discharge. I use it in the strength of ten to twenty grains to the ounce, neutralizing it afterwards. I have had success with a solution of iodide of potassium and nitrate of silver, using it in the same manner. I think it has a less deleterious effect on the cornea, in fact, it is said that corneal ulcerations offer no objection to its use, but it serves best in acute trachoma. I consider the mixture, the formula of which was published in 1884, as one of the best that can be used, and I think ophthalmologists in general would appreciate it if they used it. It consists of two solutions known as No. 1 and No. 2, the first containing silver nitrate, glycerine and water; the second containing iodide of potassium, glycerine and water; two drops of the second solution being added to one of the first, a drachm of iodide of potassium and a drachm of nitrate of silver being used to the ounce. This produces, when mixed together, a yellowish solution, probably the iodide of potassium and nitrate of silver, which, when applied to the conjunctiva, act in the same manner as a ten to twenty grain solution of silver would and without any effect upon the cornea whatever. This is a solution which can be entrusted to the nurses of an institution without

danger of doing harm. I consider this solution preferable to nitrate of silver solution in acute trachoma. It may be applied repeatedly without leaving any effects behind. The 160 cases spoken of were treated with it and they all did well, the last of them are just recovering from it now. The epidemic began a year ago.

DR. GEO. KNAPP.—I merely wish to state that it is an historical fact that after Napoleon's return from Egypt with his great army many of the soldiers were returned to their homes affected with an acute, chronic or subacute trachoma, and the German physicians did not understand it, and in consequence, a great portion of the German Empire became afflicted with the disease which afterwards was known to be trachoma. This, to my mind, conclusively teaches that the disease is transmissible.

DR. KYLE.—I have not much to say in conclusion. I think Dr. Corr is justifiable in taking the stand he does from the fact that we have not heard of the bacteriologists finding the trachoma microbe. In the treatment there is a wide range, of course, and we must adapt it to the case on hand. I believe that the consensus of opinion is that the disease is transmissible.

SKIN-GRAFTING FOR MALIGNANCY OF THE ORBIT AND ENTROPION.¹

BY FLAVEL B. TIFFANY, M.D., KANSAS CITY, MO

IT is more than fifteen years since I made the discovery that skin-grafting was a specific in epithelioma of the eyelid and orbital tissues. It was in September, 1882, that I gave this discovery to the medical profession by the publication of a case of epithelioma of the eyelids, eyeball and entire orbital contents (of Richard McGee, of Galena, Kansas). The article, with three wood cuts, illustrative of the case, was published in the *St. Louis Medical and Surgical Journal*, edited by

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

Dr. Rumbold. I presume that if the Doctor is present to-day he may recall the case, or if not, he can find it by referring to his file of the September number of 1882.

No mention up to this time nor for several years subsequent had been made of skin-grafting as a therapeutical agent in epithelioma. It was merely by chance that I discovered the potentiality of these healthy skin-plants in smothering out these malignant growths. In the case mentioned and published, I had to sweep away both superior and inferior lids and exenterate the entire contents of the orbit; as the eyeball and surrounding tissues, as well as the lids, were involved by the epithelioma. The cutting away of the lids and the exenteration of the orbital contents did not control the disease. It persisted in reappearing, even after it had been cremated by the Paquelin's thermo-cautery and was not smothered out until large skin-plants taken from the patient's chest were planted over the granular surface of the cauliflower growths which persisted in springing forth from the periosteum of the orbit, especially from its apex. After the grafts were made to adhere (and there was no trouble in this), they grew with tenacious avidity, although they were large as silver quarters. There has been no further appearance of the malignancy either in the orbit or metastatically.

Fourteen years have passed and the man is so far perfectly immune. I have had several cases of epithelioma since, involving the eyelids, and I have in each case resorted to this plastic treatment effecting a permanent cure in each case. These skin-grafts, or the healthy action of their cells, have a potentiality that decidedly dominates the cells of the cancerous growths; the former destroying the latter, changing the malignant into benign. I have used skin-grafts repeatedly for burns and phlegmonous inflammation of the lids where extensive sloughing had taken place with good results. In some cases I have used plants an inch and a half by two inches in size. I am always careful to cut the plants nearly one-third larger than the dimensions of the bed in which they are to be planted, as these grafts always shrink more or less, especially if they contain much areolar tissue. I am careful to take the skin-grafts void of any connective or adipose tissue and transfer them directly without handling. I am also careful to have all blood staunched before planting them, otherwise the grafts may

slough aside from the eyelid. I have a case in mind, a man of about forty-five years, where the cancerous growth had eaten away part of the pinna of the concha. I was obliged to remove the entire expanded portion of the external ear; and soon after this the malignancy began to make inroads up the external meatus, and had gained nearly one-third of the extent of the canal. I then removed by scalpel all the disease visible, and planted there pieces of delicate skin, cut from the patient's arm. This operation was made some three years ago, and there has been no return of the cancer.

Besides using skin-grafts as a therapeutical agent in malignant growths I frequently use them in the correcting of entropion. I take the strips of integument from the lid 2 or 3 mm. from its margin, cutting them 2 or 3 mm. wide parallel with the margin of the lid. I then split the tarsal cartilage near the ocular intra-marginal space from the punctum to the external canthus and then transplant the strip of skin, thus wedging the margin of the lid with all of the cilia from the cornea. Occasionally in taking the strip of skin I go deep into the tarsal cartilage and remove a wedge-shape piece of this tissue which I transplant with the skin. I never use a pedicle, but fasten the graft at either end and at the center by delicate silk sutures. Where there is atrophy of the tarsal cartilage at the margin of the lid, as there frequently is, with the lashes turned under sweeping the cornea, I make Green's operation, and with the grafts build up the atrophied tissue, thus wedging the lashes from the eyeball into normal position.

DISCUSSION.

DR. REYNOLDS.—Will you please answer me a question. I did not quite understand where the graft is made in a case of entropion where there is loss of substance from the border of the lid, do you make it from a distance or how do you make it?

DR. TIFFANY.—I usually take a piece from the lid, a completely detached graft without any pedicle, removing the strip of integument two or three millimeters from the margin of the lid, then split the lid in the inter-marginal space and transplant this. Sometimes I go deeper than the integument, into the tarsal cartilage, and take out a wedge-shaped piece of cartilage so as to pass up the margin of the lid better.

DR. REYNOLDS. — Skin-grafting was introduced in this country by a re-publication of an article from an extract from a prize essay by a Frenchman named, I think, Reverdin, and subsequently, in 1870, the late Dr. John T. Hodgen wrote on the same subject. In the meantime I had made a couple of experiments or experimental attempts to use it and in one case of entropion of the upper lid, with profuse loss of substance near the central portion, I dissected up and transplanted a portion of skin taken from the forearm of the patient and everything seemingly did very well for the first two or three days; it underwent the peculiar change described by Reverdin and I thought the patient was doing very well. But one night after midnight I was summoned to see him and found him in a state of collapse, from loss of blood, and I hesitated as to what I should do, and so I did what was then a new operation, I divided the external commissure of the eyelids and then split the free border and without removing any portion of the skin above at all I slipped it up higher and the patient made a very satisfactory recovery. I have had other cases in which that proceeding was not sufficient and where the cartilage had been absorbed. In that case I have divided the free border of the lid, notched it upwards at the outer canthus and the inner canthus performing in some cases external canthoplasty and then dissected up a bridge of the sound skin a distance of two or three millimeters above the line of the lash and about two millimeters broad and passing that down and stitching it at two points only near the outer canthus and near the inner canthus and allowing the center portion to lie loosely. I have never seen sloughing take place after such an operation and I have nearly always had the happiness to observe an entire recovery from the entropion. As to cutting out a wedge-shaped piece of cartilage or detaching the cartilage or cutting the elliptical fold of integument down to the surface of the tarsus, I believe I have gone the rounds, I have tried all of them, also the operation advocated some years ago by Dr. Hotz, of Chicago, seemed satisfactory in some cases, but in nearly all of them the entropion returned. So the transplanting of a bridge of skin from above is the quickest and most satisfactory, combined with external canthoplasty. I am sure that no operation will apply to all cases, but I am equally sure that Dr. Tiffany's experience is valuable and the method he uses does apply to

some cases and gives a more reasonable prospect of relief permanently than perhaps any other operation.

DR. WHEELOCK.—I would like to ask for some information about a case. A year ago last fall I enucleated an eye for an epithelioma occurring at the outer canthus involving the eyeball and rectus muscles and periosteum. I took away the entire upper and lower lids going well into the temple. I eviscerated the orbit, took out its entire contents, packed it with a 50 per cent. solution of chloride of zinc. After this the patient went away; but in about a year she returned to my office and I found that the orbit was covered entirely with a dermoid covering; there was no trace of an operation or of a scar visible to the naked eye. I am at a loss to know just what occurred there.

DR. REYNOLDS.—What was the lapse of time?

DR. WHEELOCK.—About one year. Dr. Bulson saw the same case.

DR. ALT.—You did not attempt any covering of the bone of the orbit?

DR. WHEELOCK.—None whatever.

DR. ALT.—Was the periosteum removed?

DR. WHEELOCK.—It was scraped but no chiseling or anything more than complete scraping was done.

DR. REYNOLDS.—My impression is that you have had the same experience as myself. I removed an immense sarcoma from the orbit in a gentleman, 24 years of age; he had a young wife with the prospect of an heir to his estate—which had not yet been paid for—the estate I mean; he was a driver for the Adams Express Company, was very much emaciated at the time of the operation; he gained flesh rapidly and improved in every way and in a few months' time the orbit was covered over with the same sort of growth or in the same way, the ordinary process of cicatricial contraction, the stretching of the contiguous integument. He went on five long years without any signs of trouble and just about five years afterwards the parotid gland became enlarged and in a few months a melanoma appeared at the brow. I did not use so strong a chloride of zinc solution, mine was only half a drachm of chloride of zinc to an ounce of water. My patient died, but he had recovered from the operation sufficiently to go back to his work and earn enough money to pay for his home and beget two

more fine children, and he died with an insurance policy of two thousand dollars on his life, leaving his widow that amount besides his home. The point I make is that the cicatricial contraction closed the orbit, but the Doctor will likely hear from the trouble again.

DR. TIFFANY.—I would like to say in reply to Dr. Reynolds in regard to skin-grafts being introduced that, according to my knowledge, I still maintain that those grafts which were used at that time were merely shavings placed on the ulcer to cure the ulcer. But I use them to cure and destroy the epithelium,—the cancer cells. That has never been mentioned in any article that has ever been written prior to the one that I wrote. I claim in this case that the graft has a specific effect in destroying the malignant cells—these healthy cells kill the malignant cells, it is like grafting a sour apple tree, as it were, and bringing forth good fruit. In these cases the epithelioma of the orbit or of the lids is cured and there is no return, which is almost sure to happen unless you put in the grafts. These healthy grafts prevent the return of the disease. That has been my experience not in one case, but probably in from fifteen to twenty cases. In regard to making canthotomy, I sometimes make that, but it always leaves a deformity and I avoid it unless it is absolutely necessary.

A CASE OF MENTAL DEPRESSION APPARENTLY DUE TO A GRADUATED TENOTOMY; AND THE USE AND LIMITATION OF PRISMS.¹

BY W. H. BAKER, M.D., LYNCHBURG, VA.

GRADUATED TENOTOMY, as all of you know, is an operation devised by Dr. Geo. T. Stevens, of New York, for the purpose of producing an equilibrium in the action of the external ocular muscles, when there is a lack of balance, or a disharmony in their action.

Although weakening a strong muscle, instead of strength-

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

ening a weak one, is seemingly an illogical procedure; still the operation is undoubtedly often followed by most excellent results, and I presume seldom does harm. The devotees of this new departure in ocular surgery soon published long lists of cases of epilepsy, locomotor ataxia, and kindred nervous troubles cured by graduated tenotomy. They positively made those gentlemen who give their whole attention to nervous diseases turn green with envy. Failures were so rare in their published accounts that the more thoughtful and conservative members of the profession were led to exclaim with Falstaff, "Lord, Lord, how this world is given to lying." Many aspirants for registration in the temples of fame flooded us with descriptions of new instruments for doing the simple little operation. But alas, for human hopes, many of these devices which brought so much joy to the heart of the inventor, now adorn the immense heap of useless relics, stored away in the medical mausoleum.

Sometimes the operation of graduated tenotomy has but little physical effect, if indeed any, when at the same time it may have a favorable mental effect. I think we will all agree that like many other minor operations it does occasionally relieve the condition by a favorable mental impression. Yet, in order to be consistent, we are obliged to admit that it may sometimes produce a very unfavorable mental impression. And in the particular case that I will relate, the mental deviation was in the wrong direction. I have seen several cases of a milder form, but this case is unique in my experience, as the result of an ill-advised graduated tenotomy.

In February, 1896, Mr. E. G. consulted me in regard to his condition of intense mental depression, which he attributed to an operation that had been done upon his eyes. He was a man of good physique, highly nervous temperament, unusually good mental development, and exceedingly sensitive to all extraneous impressions.

He gave me the following history: When about 15 years of age (he was then 22), while a student at one of the colleges, his eyes commencing to give him trouble, he consulted an oculist, who discovered and corrected a vertical astigmatism, thereby giving him perfect relief. The principal of the school being very ambitious for him, persuaded him to undertake too much work. His eyes again failed him, and very soon he

found it necessary to abandon his studies altogether. He then consulted an oculist in one of the large cities, who told him that while he had a refractive error, the whole trouble was caused by an esophoria of 3° in one eye and $3\frac{1}{2}^{\circ}$ in the other, and very strongly advised the operation for weakening the opposing muscles. He finally consented, and the operation was done upon both eyes at one sitting. The surgeon told him that the muscle strength of one eye was reduced 3° and the other $3\frac{1}{2}^{\circ}$, thereby producing a perfect equilibrium.

The operation did not relieve him, and instead of repeating it, the oculist adjusted prisms and corrected the hypermetropic astigmatism. This gave him partial relief, but he was never enabled to resume his studies at the college. He was finally able to do some newspaper work which he accomplished with very little discomfort, until he accepted a position in New York and removed to that city. His work there was very arduous and soon caused pain in his head and eyes, and this combined with some spiritualistic ideas which he had lately imbibed threw him into a state of intense melancholia, from which he has never entirely recovered.

An examination proved that he had compound hypermetropic astigmatism, both eyes $+4.5$ D. $\subset +.50$ D. c. ax. 90° , and about 4° of esophoria in each eye, showing that if his statement was correct as to the degree of esophoria (and I believe it was) at the time the operation was performed, this operation had little, if any, effect in producing a balance or equilibrium in the muscle action. The ophthalmoscopic conditions were, and always have been, perfectly normal.

He said that the ends of the tendons that had been clipped felt as if they were loose, and he kept his eyes rigid, for fear of dislodging the muscles. Light was often very disagreeable, and frequently painful, especially when he felt that he was looking into the sun. He wore blue glasses and prisms alternately. He said that once, while visiting in one of the large cities, he consulted an eminent oculist, who told him that the wrong set of tendons had been clipped and that the esophoria was increased by the operation, but he was so sure about the side of the eye upon which the operation had been performed that I am convinced that the oculist was mistaken. I believe the operation was done imperfectly, in a half-hearted, unbelieving kind of way, with the hope of a good mental effect,

which good effect failed to materialize. I simply ignored the esophoria and astigmatism and corrected about half the hypermetropia, and then after a few months had passed with some improvement, gave him the full correction. During this time he was undergoing constitutional treatment.

I received a letter from his mother a few months ago, informing me that he had improved very much.

He is still far from well, complains of an unpleasant light sensation, of soreness at the insertion of the tendons, and a disagreeable feeling of flattening of the eyeballs. These symptoms have produced a psychical effect best described as melancholia, which still clings to him with aggravating persistency.

Like many other minor operations, partial tenotomy can be done without producing any effect either for good or evil. And, unfortunately, some of the less scrupulous members of the profession, those who love money more than the honor of the profession, have taken advantage of this fact in order to enlarge their fees. They tell a confiding patient that an operation is necessary in order to give complete relief, and the fee is out of all proportion to the importance of the operation. I do not bring this accusation without abundant proof to substantiate it. I will briefly relate one case as a sample of a fairly good collection of similar cases.

A gentleman afflicted with myopic astigmatism had been wearing correcting lenses with perfect comfort for twenty years, but about a year ago his eyes began to give him trouble and he consulted me on one of his hurried trips to town. I found, on a very casual examination, that the myopia had increased and that he needed a change of glasses. He left hurriedly, saying that he would return in a few days and have the glasses adjusted. In the meantime he was called to New York on business. While there his eyes gave him so much trouble that he was compelled to see an oculist. The doctor gave him a very thorough examination and adjusted the necessary glasses, and then told him that in order to give him perfect relief it would be necessary to operate upon the muscles of the eyes. After some persuasion he consented. One eye was operated upon and he was then told to come back the next day for the other operation. But the glasses gave him so much comfort that he decided not to have the other operation per-

formed, and so informed the oculist, who promptly charged him an enormous fee, and when it was paid allowed him to depart in peace. He has since had no trouble.

Is comment necessary in such a case? It seems that the oculist was either riding a *hobby* at a fearful pace (which I can hardly believe) or was operating for a fee.

Occasionally we may find an increase of the heterophoria a few weeks after a graduated tenotomy has been performed. Only a short time ago I operated upon a case showing 10° exophoria immediately before the operation, and ten days afterward an examination revealed 12° of the same. My operation may not have been as clean cut, and as free from bruised tissue, as the work of more experienced operators, but I do not think this alone can account for the large increase in the esophoria. I believe it occurs with the best operations. When we consider the ordinary processes of repair and the methods used by Dame Nature in bridging over solutions of continuity, we can hardly be astonished at the occasional result mentioned. Nature chooses her own materials for repairs. She seems to use a very unyielding and inelastic tissue for the purpose. And so we are apt to find that the rectus muscle, instead of being weaker, and perhaps longer, is stronger and shorter after the operation, and the trouble is increased. When this happens I presume the thing to do, is to operate and re-operate until the tendon is weakened in spite of all opposition on the part of Nature. This fact, no doubt, accounts for the criticism made by the doctor mentioned in the narrative of the case of mental depression, "that the wrong set of muscles had been operated upon." And when I saw the patient several years afterward the cicatrix had yielded sufficiently to allow the esophoria to remain about the same that it was prior to the operation. In other words, Nature had restored the original condition.

In strabotomy we make a clean sweep of the tendon attachment and get the desired result not by weakening the body of the muscle, as in partial tenotomy, but by changing the leverage power by causing the tendon to become re-attached farther back to the globe, thereby shortening its pull, and then with the help of the focusing power of the eye, Nature does for us exactly what we wish. Nature is decidedly friendly to strabotomy, but very unfriendly to partial tenotomy.

I have not mentioned these things as an argument against graduated tenotomy, but against the atrocities and wrongs committed in its name. I do not think it has found its proper place in surgery. It is still lauded too much by its advocates, and too much decried by the unbelievers. It has not been thoroughly tested by unprejudiced witnesses, measured accurately as every surgical procedure should be, and stored away in its proper surgical niche, to be called for when actually needed. Instead of being a primary expedient, as many of its advocates make it, it should be a *dernier resort*, not in the common acceptation of this term, as the last thing to be done before death or utter failure, but with the confident expectation of a brilliant result.

When we find a case of heterophoria, the cause should be the first thing to seek. And then everything known to ocular science in the way of treatment should be tried before resorting to the operation. If we find that our patient is below *par* physically, it will require a great deal of skill in the selection of the proper remedies. If the heterophoria lies anywhere between 2° and 10° prisms will do wonders in giving relief.

I am surprised to know that many eminent oculists limit the application of prisms for the relief of muscular insufficiencies to the gymnastic exercise of the weakened muscles by opposing prisms. This plan of treatment is frequently attended with marked success if it can be carried out, but it is tedious and exceedingly slow in its effect, and therefore impracticable in the case of school children, except with those good little boys that are never known to live to a ripe old age, and to those other clever, bright-eyed little hypocrites, who are willing to wear gymnastic prisms until the end of time, if thereby they can make the eyes an excuse for escaping school. These shameless little wretches find that there is some trouble with the eyes that gives little, if any, inconvenience, but fools the doctor and parents, and they will work eye pain and gymnastic prisms for all they are worth. Needless to say that the remedy in such cases should be applied to that time-honored spot, which has made the birch famous in history.

I have seen so many cases of pain from heterophoria relieved by properly adjusted prisms that I do not understand how any one who has worked with prisms can limit their use to gymnastics alone; particularly in cases of exophoria and

esophoria and sometimes hyperphoria, but especially in cases of homonymous horizontal troubles the relief is frequently instant, complete and permanent. I find that the best results follow the use of *crutch* prisms in the case of young school girls about the age of puberty. The muscles are then lax, and a slight hypermetropia or astigmatism aggravated by, or complicated with, heterophoria, may cause no end of trouble until the heterophoria as well as the error of refraction is corrected.

I think it will be well to mention here, that sometimes, after we have carefully corrected the compound refractive trouble and find no muscular weakness, the patient will complain of a periodic, momentary, sharp, lancinating pain shooting through the eye. We examine the lenses and find that the optic centers line up all right, but we must not lose sight of the fact that the optician, in making the lenses, grinds the sphere on one side of the glass and the cylinder on the other, and therefore the optic centers of the cylinder and sphere may not be in exact line, thus causing a twist in the rays of light, which is very trying to the eye. We can only suspect this from the symptoms mentioned as following the correction, as we have no way of detecting this effect in the lens. I do not think this fact has ever been referred to before.

I do not think it necessary to correct heterophoria of less than 2° , and then only correcting from 15 to 50 per cent. in esophoria, and from 25 to 75 per cent. in exophoria; dividing the correction equally between the two eyes if possible. I believe that in the vast majority of cases of heterophoria ranging from three to eight degrees, prisms adjusted either for gymnastic exercise or as a crutch for the weak muscle the very best results are obtained, and the operation of partial tenotomy is contra-indicated. I am very much inclined to think that this operation should be confined to cases of at least more than 10° of muscular insufficiency, or where there is a great deal of pain and discomfort unrelieved by treatment and prisms. Every case of refractive error should be tested for external muscle trouble, and if any muscular insufficiency is detected we will be warned, and in case of future trouble we will know where to look for the cause of it.

Rapid advances have been made in this branch of our science in the past few years, and the waste places seem to be rapidly disappearing. But still there is a vast field of unex-

explored territory in this department of refractive errors and muscular insufficiencies. Astigmatism is still very elusive in many cases, and means for the relief of heterophoria are still in their infancy.

Drs. Stevens, Savage and many others in this country, and some few in the old country, are working intelligently, assiduously and faithfully in this department of ophthalmology. Out city confrères possess many facilities for experiment and study, and we of the smaller towns expect great things from them in the near future. We wish better and more accurate instruments for testing muscular insufficiencies, enabling us to arrive at quicker and better conclusions in regard to the degree of trouble and the amount of correction needed.

NOTE.—The case cited in the paper of having been operated upon by myself, which revealed 10° exophoria before the operation, and two weeks afterward 12° of same, I found, on my return home, completely relieved of eye pain. This, fortunately for me, proved to be a case of favorable mental impression.

[The discussion on this paper will appear in the next issue of the Journal.]

THE AMERICAN JOURNAL OF

OPHTHALMOLOGY.

VOL. XIV.

JULY, 1897.

NO. 7.

ORIGINAL ARTICLES.

HINTS ON THE HYGIENE OF TRACHOMA AND THE INFLUENCE OF CLIMATE AND ALTI- TUDE IN ITS MANAGEMENT.¹

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IN ORDER to establish efficient rules for the hygienic management of a disease we must first have some definite and well-defined ideas in regard to its cause, the condition of the subject and the environment most conducive to its development. In trachoma our knowledge in respect to some of these factors is sadly deficient. We have not yet arrived at a unanimous acceptance of a microbic origin of the disease. While the probabilities, in view of modern bacteriological studies, point to a specific micro-organism as concerned in some way in its development, the most diligent researches have failed to discover one which any considerable number of investigators agree upon as the special trachomatous microbe. It is contended, on the other hand, by others, that the disease

¹Read in Abstract before the Section of Ophthalmology of the American Medical Association held in Philadelphia, June 3, 1897.

is but an affection of the adenoid tissue of the conjunctiva set up by an inflammation of any origin whatever—traumatic or microbic—in an individual predisposed to that particular morbid process, and who is in a condition favorable to its outbreak. In other words, a commonly recognized specific agent for the causation of trachoma has not yet been discovered. Even its contagiousness, *per se*, which was formerly accepted as one of the chief characteristics of the disease, is now questioned by many. The inoculation of trachomatous material into a healthy conjunctiva has failed to produce the disease (Van Milligen). And while it is true that the discharge from an eye suffering from trachoma may, and undoubtedly has, caused an outbreak of the disease in an unaffected eye this is easily accounted for by the fact that these discharges contain micro-organisms which when transplanted to another eye will set up an inflammation, not however necessarily trachomatous, but which may lead to the development of trachoma in an eye predisposed to it. This matter of predisposition is one which has attracted any considerable attention only recently. In former times trachoma was looked upon as a purely contagious disease to which all persons were liable in nearly the same degree and this is the position held by quite a number to-day. The facts, however, which have been elicited by a systematic investigation of its prevalence among the different races have shown such a disparity of susceptibility among them that we are forced to consider race as an important factor in the development of the disease. This fact would establish the necessity of a predisposition, and constitute a dyscrasia, a most important element in the line of causation. Some races, as the negro in the United States, are practically immune, even amid the most unfavorable hygienic surroundings, while others, as the Irish, Polish Jews and Italians, are particularly liable and suffer greatly wherever they may be under circumstances at all favorable for its development.

With the acceptance of the theory of a dyscrasia or predisposition our ideas in regard to the hygienic management of trachoma must differ somewhat from those based on a theory of pure contagiousness. Unfortunately, the theory of a dyscrasia has been seriously considered only a short time and our knowledge of the nature of the predisposition is very limited. This is the field which promises a better return for labor and in-

vestigation than any other concerning this important disease. The clinical picture of trachoma, its result, its treatment, medicinal and surgical, have engaged the attention of surgeons almost exclusively up to a recent date. Its prevention has come in for a small share of their attention. We must remember that after all the chief function of our science is not so much to cure disease as to prevent it. To this end we must study the natural history of the disease with the conditions of the patient and his environment which are most favorable for its development. For this purpose comprehensive collective statistics from all parts of the world are necessary.

It must be borne in mind that here as well as in diseases of a demonstrated or suspected microbic origin we must have for the development of the pathologic process not only an active, but a predisposing cause. In the case of a microbic disease there must be not only the seed but also the soil in which it least grows and develops. Even in the healthy conjunctival sac we have always micro-organisms, and some of them have been found to be pathogenic when the condition for their development are propitious. Hitherto we have given most of our attention to the microbe, its form, varieties, habits, etc., to the neglect of the condition of the soil necessary for its growth. Any system of hygiene, therefore, which aims at anything like scientific exactness, must consider the nature of the soil as well as the character of the micro-organism itself. This is of course under the supposition that there is a specific microbe for trachoma. But even if there should be no specific micro-organism there must be something which starts the morbid process into action. In trachoma it would seem that an inflammation of the conjunctiva coming from microbic infection, smoke, dust, vitiated air or other irritating influence is sufficient to prepare the ground for the specific affection. The first law, therefore, in the prevention of trachoma, or in the management of those suspected of having a predisposition to the disease, is the avoidance of those conditions which lead to conjunctival inflammation. These patients should be kept away from those suffering from any form of contagious ophthalmia. Most of all they should be removed from such overcrowding as produces a vitiated and irritating atmosphere, and they must not be allowed to follow any occupations where there is much dust or smoke. Out-of-door work is therefore

not always to be commended for it is precisely these occupations that furnish such conditions, particularly as regards dust. General farming is to be avoided, as a rule, for in planting and attending crops, harvesting, threshing, and in many other labors pertaining to farm work, there is commonly a great amount of dust and other irritating material floating in the air, while the ammoniacal vapors of the ordinary farm stable are very irritating to the conjunctiva. For the same reason dusty localities are to be avoided. The effect of climate on the development of trachoma is probably excited largely through these influences, for we find that as a rule those places on the sea-coast where there are not other actively productive causes in operation are affected in a much less degree than those interior localities which are subject to long droughts. Dryness and humidity of themselves do not seem of much importance. Some of the most malignant cases we have among the native-born Americans are found in the interior regions of Kentucky and West Virginia. Even the high altitude of Colorado is not free and most probably on account of the dust. Altitude itself, if we are to accept the testimony of many eminent observers, has a markedly good effect on the virulency of the disease, where there are no counteracting influences; but high altitudes are not to be commended if they are dusty.

In accordance with these facts, which it is earnestly hoped will be extended or modified by other observers, the ideal climate is one of an elevation where the air is clear and bracing, at least 300 meters above the sea level, and which is devoid of dust and other irritating material.

MARKED IMPAIRMENT OF CENTRAL VISION
FOLLOWING PROLONGED USE OF
THE AFFECTED EYE.¹

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MR. S., aged 30 years, a graduated student in the chemical department of the Johns Hopkins University, consulted me on February 16, 1897, on account of a pain and soreness which he had experienced for several days in and over his right eye. He stated that just after recovering from an attack of the grippe of a week's duration he had taxed this eye very severely, and explained that he had been engaged in "calibrating burettes." Three burettes had been assigned him for this purpose, and he had spent about five hours a day for six consecutive days in testing their accuracy, or in "calibrating" them, as it is termed, using his right eye only. The burettes are graduated to tenths by a cubic centimeter, but an error amounting to only a tenth of one of these tenths can be detected by a trained eye, and it is such almost infinitesimal departures from absolute accuracy that the student is expected to note and record. As each burette has a capacity of 50 cc. and each one of these cubic centimeters must be gauged in this careful manner, it can be readily understood that the strain upon the eye must be very considerable. Some students, it seems, calibrate binocularly, while others obtain better results by using only one eye.²

Mr. S.'s eyes had been slightly asthenopic for some time before the occasion which led him to seek my advice, but they had not annoyed him sufficiently to induce him to consult any one in regard to them. At his first visit the ophthalmoscope showed nothing abnormal except the presence of a slight

¹Read before the American Ophthalmological Society, Washington, May 6, 1897.

²In calibrating the diffuse light from a window is used and falls upon the burette from one side, so that the gaze is not towards the light.

amount of hypermetropia, and there was nothing noteworthy in the external appearance of the eye.

A lotion of opium and boracic acid and a collyrium containing $\frac{1}{8}$ gr. of sulphate of zinc and 12 grains of boracic acid to the ounce were prescribed, and he was directed to report in a few days if not relieved. The vision was not tested at this visit. Two days later he was seen and stated that the eye was not improving. The right eye then showed $V. = \frac{20}{xxx} +$; the left eye $= \frac{20}{xv} -$. On February 20, two days after this, several small, well-defined, whitish exudation spots were detected in the right eye, in the neighborhood of the macula, such as are not infrequently observed in miliary choroido-retinitis due to accommodative strain.

February 24. A careful test of the refraction was made. Astigmatism was excluded, and $+ .87$ s. glasses were prescribed, to be worn, probably, only in near vision. Vision in right eye about as when first tested, $\frac{20}{xxx}$.

February 27. Patient reports sight of right eye much dimmer. Right pupil is now somewhat larger than the left and is less responsive to light. Right eye, $V. = \frac{20}{oo}$ (?). Ophthalmoscopic changes not appreciably altered. Calomel to be taken every hour in $\frac{1}{10}$ -gr. doses.

March 2. Right eye, $V. = \frac{20}{oo}$. Ophthalmoscope shows, in addition to the exudation in the macular region previously noted, slight inflammatory changes (exudative) in the retina near the outer and upper margin of the disc. Calomel discontinued and pilocarpine muriate prescribed, beginning with a dose (by the mouth) of one-sixth of a grain. Urine tested for albumen with negative result.

March 5. Vision unchanged. Field of vision taken, showing a paracentral scotoma for white as represented in the accompanying chart.

March 7. An improvement in the vision is noted ($\frac{14}{oo}$), and from this time a progressive change for the better occurred.

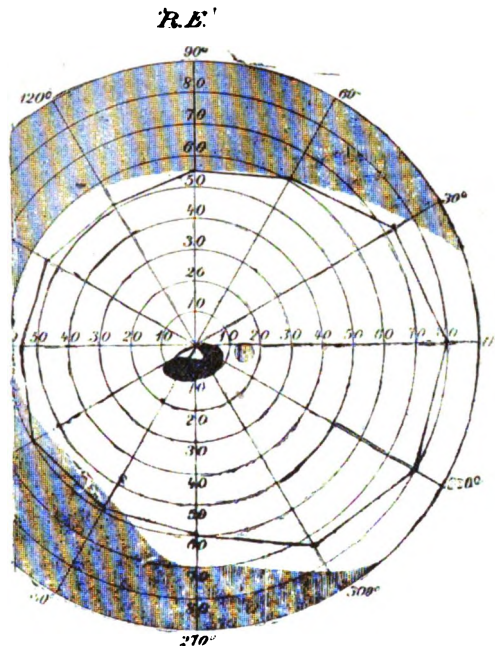
March 15. $V. = \frac{20}{xxx} +$. Pilocarpine discontinued and $\frac{1}{24}$ gr. hydrarg. biniod. prescribed, to be taken three times a day.

March 29. $V. = \frac{20}{xxx}$; scotoma has disappeared.

April 19. $V. = \frac{20}{xx}$, missing only one letter. Fundus examined without detecting anything abnormal.

May 3. Patient has been at work in the laboratory since

April 1, and has felt but little inconvenience from his eyes, though he says he is conscious of not seeing as clearly with the right eye as with the left. Is still taking the biniodide. A careful inspection of the macular region shows two minute whitish spots still present and slight irregular pigmentation. The retina near the disc presents a normal appearance. Right V. = $\frac{20}{xx}$, except one letter and three letters of $\frac{20}{xv}$. Left, V. = $\frac{20}{xv}$.



It would seem that the unusual strain to which the eye was subjected in this case produced a central exudative retinitis, not unlike that which has been observed as a consequence of prolonged exposure of the eyes to the direct rays of the sun or to the glare of the electric arc light. That the recently-recovered-from attack of grippe was a factor in bringing about this condition seems not unlikely. The points of interest are that the decided decline in vision should not have occurred until so long a time after the strain of the eye (eleven days after his first visit to me and about eighteen days after he had finished testing the burettes), and that with such seemingly insignificant ophthalmoscopic changes, the impairment of sight should have been so marked as it was ($\frac{8}{cc}$).

ANTISEPTICS AND ANÆSTHETICS IN OCULAR OPERATIONS.¹

BY JOSEPH E. WILLETTS, M.D., PITTSBURG, PA.,

OPHTHALMOLOGIST TO THE EYE AND EAR HOSPITAL OF PITTSBURG, PA.

IN OPERATIONS upon the eye we have less to do with antiseptics than with asepsis. We do not have to disinfect a contaminated wound, but to make a wound that is clean and keep it from contamination. How to do this without causing irritation or hyperæmia of the eye is a factor bearing on the successful result of the operation which can not be overlooked.

All applications to the eye, before cataract extraction especially, whether they be antiseptics or anæsthetics, if they cause hyperæmia of the conjunctiva, they are antagonistic to the result desired, and should be avoided. Under this head come formaldehyde and eucaine hydrochlorate. The former has no advantage over mercuric bichloride, since experience has shown the latter to be all that could be desired; and the best results are to be expected from that germicide which has the desired effect, with the least irritating influence.

The tendency to destroy the cutting edge of instruments, incident to bichloride solutions, may be overcome by refushing the conjunctival sac with a solution of acidum boricum just prior to the operation. Non-irritating antiseptics and non-irritating anæsthetics are essential requisites to success in ocular operations. The new local anæsthetic eucaine hydrochlorate is a decided irritant. The anæsthesia of an eucainized eye is accompanied by an hyperæmia of the entire conjunctiva which outlasts the anæsthesia. Experiments have shown that it also causes a lachrymal hypersecretion.² These two factors alone debar it from ophthalmic practice. In corneal ulcers, foreign bodies, etc., the predominant symptoms are photophobia, lachrymation, congestion, and pain. The application of

¹Delivered before the Medical Society of the State of Pennsylvania at Pittsburg, May 19, 1897.

²Berger.

this drug relieves the pain, but increases the conditions that produce it. The makers of the drug, when they recommend it in ophthalmic work, ask the ophthalmologist to ignore the fundamental basis of the science of medicine, and treat *effect* instead of *cause*. Its sole claims to ophthalmic work are its stability, and that it does not cause exfoliation of the corneal epithelium. The former ought not to be considered, as the expense incurred for a fresh solution of cocaine hydrochlorate is slight, and the latter advantage is not sufficient to cover the other objections. Hydrochlorate of cocaine is the ideal anæsthetic in ophthalmic practice, especially so for extraction. However, something depends on the method of its application. The frequent instillation into the eye at intervals of fifteen minutes, as advised in some text-books, is not only unnecessary, but a bad practice, and a detriment to the best final result of the operation. Anæsthetization of the entire eye should be avoided. Any drug that has a primary action, must have a secondary effect, and this is especially true of cocaine. The ischæmia produced is followed by a hyperæmia, the extent of which is in direct ratio to the profundity of the anæsthesia. Three drops of a 4 per cent. solution of cocaine hydrochlorate dropped in the line of section, is all the writer uses for an extraction with an iridectomy. In this way complete ischæmia of the eye is not only prevented, but also the increased afflux of blood to the eye, consequent on the dilatation of the vessels, which occurs after the anæsthetic effects of the cocaine disappear. A too profound anæsthesia from cocaine produces, after the eye is bandaged, the identical hyperæmic condition that should be avoided, and also increases the tendency to exfoliation of the corneal epithelium.

When cocaine is used sparingly, and the lids kept closed after its application, there is no exfoliation of the corneal epithelium. There is no increased afflux of blood to the parts, after the eye is bandaged, and there is no lachrymal hypersecretion.

KERATOCONUS.¹

BY J. W. BULLARD, M.D., PAWNEE CITY, NEB.

THE only excuse I have to offer for preparing this paper to read before the Association is, that in looking over the literature of the subject, I found it to be very meager, and especially so in the more recent works on ophthalmology at my command. It is much more exhaustively treated in works written a quarter of a century ago.

I hope to bring out a valuable discussion on the subject by men present who have had a large experience in the treatment of this disease, which we know is usually of more value to the members than is the subject matter of the paper itself.

In the reports of the Wills Eye and Ear Hospital of Philadelphia (kindly sent me by my friend and recent house surgeon, Dr. J. Floyd Murdoch, of Pittsburg, Pa.), for the years 1894 and 1895, out of a total of 12,614 cases of eye disease treated during the former year, there were 1,486 cases with disease of the cornea and sclera, of which number 22 cases were cornea conica. In the latter year the total number of cases was 13,856; 1,739 cases of diseases of the cornea and sclera, only 18 of which being the disease in question, or a total of 40 cases in 26,470 cases of eye disease treated during this period of two years.

In the report for the year 1895 of the Royal London Ophthalmic Hospital, Moorfields, which I received through the courtesy of Messrs. Edward Nettleship and E. Treacher Collins, who are members of the staff of that institution, I find that out of a total of 28,474 out- and in-patients treated during the year, there were 12 cases of conical cornea operated on. How many cases presented themselves who were not subjected to operation, the report does not state.

From the above reports it will be seen that conical cornea is a comparatively rare disease.

Keratoconus is a non-inflammatory disease in which the cen-

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

tral part of the cornea, gradually and without any apparent cause, begins to bulge forward in the form of a cone. The apex of the cone is rarely central, usually below the center and in my experience external.

In the early stages the cone is perfectly transparent and the peripheral portion retains its normal curve, subsequently, however, the central portion continuing to increase its bulging, the peripheral parts are more or less involved in the general conicity. At first the patient complains, if he has previously worn glasses, that his lenses do not give as clear vision as formerly, or if he has not been wearing correcting glasses, that his vision is becoming dim. At this early period we must examine very carefully or we will overlook the true cause of the defective sight. We note a diminution in the size of the corneal reflex in the central part of the cornea. When we reflect the light from the sky or ophthalmoscope on the cornea we get a bright central reflex from the fundus, surrounded by a dark or shady zone which in turn is surrounded by a bright zone of fundus reflex through the peripheral, or normally curved cornea. The shadow plays around, but never crosses the central fundus reflex. As the disease becomes more advanced numerous phenomena appear as the reflected light from the mirror is made to play on the cone from different points. The retinal vessels appear much distorted when viewed with the ophthalmoscope, ever changing in apparent shape and size, with every movement of the observers head.

As pointed out by Dr. Knapp, the bright central zone is due to the reflection of the fundus through the central part of the cone, and the outer bright zone to the fundus reflex through the normally curved periphery of the cornea and the dark intermediate zone to the diffusion and complete reflection of the rays of light at the base of the cone where it passes over into the normal curvature of the cornea.

The great confusion of vision is caused, not so much by the conical condition of the cornea, as by the irregular, astigmatic condition which leads to great distortion of images. As the disease becomes more pronounced it is quite easily recognized, especially when viewed latterally, the cone is easily seen, and when quite pronounced shows readily through the closed lids, as the ball is moved in different directions.

When the disease is far advanced, from thinning of the

cornea, increased friction and exposure, the epithelium at the apex begins to be disturbed, the cells are swollen and exfoliate, an interstitial keratitis manifests itself, spreading several millimeters in each direction from the apex and causing a dense opacity. The eye now becomes painful, the episcleral vessels engorged, photophobia supervenes, and there is great increase of lachrymation. Oblique illumination and a magnifying lens will show the delicate cornea propria denuded of its epithelium. What is quite remarkable, though the keratitis at the apex may become severe, perforation rarely takes place.

The patient, as the disease progresses, seems to become more myopic, and brings the objects looked at very close to his eyes, but perfectly clear vision is not attainable with spherical, concave lenses, because the bulging of the cornea is not spherical but conical (hyperbolic). (Fuchs).

As a rule both eyes are affected, usually one in advance of the other.

It usually makes its appearance during the second or third decade of life and is said to be more likely to attack females than males. It may date its onset from some exhausting sickness. It is often associated with chronic dyspepsia and appears to be due to defective nutrition in that part of the cornea farthest from the blood supply. (Nettleship).

Its development is very graduated, ultimately, however, the process comes to a standstill, but, as a rule, not until useful vision is nearly or quite lost. The bulging occurs because the front of the cornea progressively becomes thinner, and gradually yields before the intra-ocular pressure, which, however, is not increased, but rather lessened considerably below the normal. This is probably the reason that perforation so rarely takes place, the power of resistance and intra-ocular tension being proportionately equalized.

The real cause of conical cornea is represented by the unknown quantity *X*, whose true value has never yet been found.

The prognosis is not very favorable as unaided by treatment useful vision is usually lost. In recent years the progress has been stayed, and vision very much improved by operation and properly adjusted lenses.

TREATMENT.—All cases of myopia should be very carefully examined by retinoscopy for the first evidence of conical

cornea, and if discovered, everything which tends to increase the trouble should be avoided. The patient should be much in the open air, avoid using the eyes for near work, nutrition should be stimulated as much as possible by tonics, good food and proper hygienic environments. The best possible correction should be given with lenses, dry pressure bandages applied to the eyes at night, and a course of myotic treatment with eserine or pilocarpin be instituted, the results of the latter being carefully watched. These things are done with a view of checking the progress of the disease.

Many modes of operative procedure have been advocated, first, to limit the disease; second, to correct the deformity of the cornea; and third, to establish an artificial pupil. Sir W. Adams removed the lens to neutralize the myopia. Mr. War-drop recommended frequent tapings. Iridectomy and iridodesis were done, both to check the progress of the disease and to afford a new pupil. Von Graefe produced ulceration of the apex; Bowman and De Wecker employed trephines; Mr. Bader excised an elliptical piece of the apex, and Mr. Critchett, as it was difficult to get both sides of the wound of equal size, invented a double knife, so arranged that when shoved through the apex it cut out an equal piece from each side.

Perforation through the apex with the galvano-cautery is a classic treatment now. The central idea to meet the second indication is to get a flat cicatrix at the apex of the cone which very favorably influences the conicity. As opacity, to a greater or less extent, follows this operation, an iridectomy is frequently required to form an artificial pupil behind transparent corneal tissue.

I recently operated on a severe case of conical cornea in a single lady, 26 years old, who had been mildly insane for the past six years. She was a well developed woman in robust health except in her mental faculties. About the time her mind became affected her eye-sight began to fail. Shortly afterward, in June, 1891, she was brought to me with the statement that she had always been near-sighted, but was much worse since the derangement of her mind. At this time vision was as follows: O. D. = $\frac{1}{cc}$; O. S. = $\frac{12}{oo}$. With the following correction vision was $\frac{20}{LXX}$ in each eye; O. D. — 5. D. s. $\bigcirc$ — 2.50 D. cyl. ax. 150°; O. S. — 6. D. s. This correction was given her and worn for about four years with apparent satis-

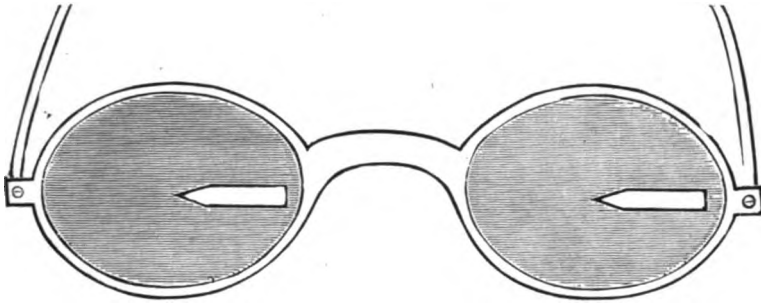
faction. She then broke one of the lenses and as her mind was not right, she was allowed to go for a year without attention, during which time she read more or less, bringing her paper or book very near to her eyes.

In January, 1896, as she was going to make her home with an uncle in another State, she was brought to me again with well advanced keratoconus of both eyes, but more marked in left. V., O. D. = $\frac{1}{\infty}$, same as before; O. S. = $\frac{1}{\infty}$. As she was going away I had not time to treat the case, so prescribed — 20. D. s. light-blue tinted lenses which improved her vision somewhat and wrote the family physician to refer her to some neighboring oculist. The oculist to whom she was taken told her relatives that nothing could be done and she would soon be blind.

She returned in December, 1896, with the apex of the cone of the left eye opaque and considerable irritation about the eye. After the instillation of atropia the blade of a Graefe cataract knife was passed vertically through the apex opening the anterior chamber and a pressure bandage applied. One week later the knife was passed horizontally in the same manner, the upper margin of the wound grasped with an iris forceps, a small piece removed with iris scissors and bandage re-applied. The bandage was removed once each day and the conjunctival sac flushed with a boric acid solution. One week later the incision was repeated and a piece clipped from the lower wound margin. The patient had, when last seen, nearly a normally curved cornea with a small opacity which will probably necessitate an iridectomy after the cicatrix has accomplished its full force when the proper refractive correction will also be given. Both eyes were kept under the influence of a one grain to the ounce solution of eserine after the last operation. It is always advisable to use atropia before opening the anterior chamber for fear of anterior synechia. In the way of lens correction no rule applies. The eye is irregularly astigmatic, and frequently changes in a short time. Unless there is opacity the patient usually sees best while under the influence of a myotic, for most of the distorted rays are shut off by the contraction of the pupil. Simple cylinders of high refractive power may be of much utility in some cases.

A stenopæic slit set at the proper axis for the particular case may give fairly useful vision. In a recent letter from Prof.

H. Snellen, of Utrecht, to the writer, he gave his latest suggestions for the treatment of conical cornea, and kindly drew for me a representation of his spectacles, which I here reproduce, together with a copy of that part of his correspondence bearing on the subject as follows :



"H. Snellen's spectacles for cornea conica, consisting in black metallic plates with stenopæic slit, running from left to right, and ending in the middle with a sharp point. Enables the patient to read if the point of the slit is brought just in the visual line. I further apply dry bandage at night, alternatively on left and right eye, and in progressive cases I do a series of small sclerotomies f. i., twice a week, all round the corneal edge, each time one. * * * Yours faithfully,

PROF. H. SNELLEN."

DISCUSSION.

DR. TIFFANY.—In regard to the etiology of keratoconus I believe it is pretty well known that it is due almost always to interstitial keratitis. There is a tissue degeneration, the cornea loses its tone and from intra-ocular pressure the conical cornea results. The Doctor speaks of never having seen it follow ulceration of the cornea. This is somewhat remarkable, when we remember we never have ulceration with interstitial keratitis. You will find that a very large per cent. of conical cornea is due to interstitial keratitis. As to the treatment, the Doctor has outlined that. The refraction in these cases is not a true myopia, it is irregular astigmatism, sometimes it can be benefited by cylindrical glasses or by spherical concave glasses, but it can not be very much helped as a rule. The operation which is the best produces a flat surface. This may be improved upon by an iridectomy.

DR. BULSON.—I am somewhat surprised to hear that conical cornea is caused by interstitial keratitis. My experience has been exceedingly limited with this class of cases; I have seen only two, one about six years ago and the other last fall, but I must confess that I never saw keratoconus develop from interstitial keratitis. It would also seem strange to me that it should occur in such a small area and that in the center of the cornea. Examining a conical cornea closely it looks as if a bubble of water was located on the anterior portion and I can not understand why there should not be more of the typical appearance of interstitial keratitis if that is the cause of it, though theoretically it would seem that it might cause this trouble. The first case I observed I did absolutely nothing for. I found no means of giving any particular improvement. I tried some six or eight times and spent considerable time in attempting to give some sort of correction, but I found no lens that would do it. I informed the patient that I knew of nothing that would give a positive relief. A year ago I heard from the patient, that the process seemed to have stopped.

The case I saw last occurred in a lady, 18 or 19 years of age. She said she had noticed her vision failing about a year previously. Upon examination I found a typical conical cornea a bubble-like appearance on the upper portion. There was no evidence of interstitial keratitis. She was a healthy, robust girl. No lens gave any improvement. As in the other case, I did not offer to do anything for this reason,—that I could not understand why these cases should be benefited by producing an opacity of the center of the cornea with a vision already reduced. It is possible that an improvement does occur. I have no doubt it does, because some of the cases reported tend to show that, but these cases, so far as I know or have been able to discover from the literature on the subject, go just about so far and there they stop. The patients generally see fairly well for ordinary purposes, in fact, my patients could apparently read with comfort, the main difficulty being to see at a distance as vision was reduced in one instance to $\frac{5}{60}$.

DR. TIFFANY.—In regard to the explanation I gave I will say that it is from my own experience. I have had hundreds of cases of interstitial keratitis, and almost invariably they will result in conicity of the cornea. I have about 1300 (?) a year, and a great many of these cases have conical cornea.

DR. BULSON.—It certainly is possible to have keratoconus without preceding interstitial keratitis.

DR. TIFFANY.—If you do, it will probably be congenital. It may follow ulceration of the cornea and the giving way of some of the lamellæ from intra-ocular pressure; but probably it would be congenital, when it is not due to interstitial keratitis.

DR. ALT.—I must confess that I also was astonished at the statement that keratoconus was almost invariably the result of interstitial keratitis. I do not doubt the possibility of the cornea becoming stretched in consequence of the parenchymatous keratitis, but it so happens that the few cases which I recall as having come under my observation, had not the slightest symptom or history of anything of that kind. I recall one young man who, under my observation, developed an astigmatism and the keratoscopic picture reminded me forcibly of keratoconus. I told the young man I was afraid his cornea would develop keratoconus and asked him to let me see him from time to time, and he has developed a typical keratoconus in a few years in one eye. He never had any symptom of interstitial keratitis. Another case I recall was that of an elderly lady who consulted probably all of the oculists of this city. She had an enormous keratoconus in both eyes with absolute transparency. I have proposed an operation to her, but she will not consent. With regard to the therapeutics, the operations may be of some help, but a very good result I think nobody has reached. With regard to the etiology, I have had occasion to examine three cases histologically. In two I found nothing to explain the clinical condition. In one eye there was scar tissue and a rupture of Bowman's membrane at the apex of the cone.

DR. BULLARD.—In answer to Dr. Tiffany's statement that keratoconus is the result of interstitial keratitis, so far as the cases I have seen are concerned, there was absolutely no interstitial keratitis when I first saw them; but as the cases progressed, by the aid of focal illumination and a magnifying lens, one could see the fine striate lines of beginning interstitial keratitis. This did not appear, however, till the cornea at the apex of the cone was much thinned and from exposure and increased friction the protecting epithelium had been destroyed, and the cornea proper exposed. Until the disease is well ad-

vanced the cornea is perfectly transparent and looks as Dr. Bulson expresses it, like a clear bubble on the anterior portion of the cornea.

A year or two ago a physician of Youngstown, Ohio, whose name I do not now recall, read a paper on this subject before the Section on Ophthalmology of the American Medical Association, in which he reported two cases treated by the cautery with quite flattering results. This paper was discussed by Drs. Knapp and Noyes, of New York, Chisolm, of Baltimore, and Jackson, of Philadelphia.

THE TECHNIQUE OF CATARACT EXTRACTION.¹

BY B. E. FRYER, M.D., KANSAS CITY, MO.

THE principles governing general surgical procedures are of course in the main applicable in ophthalmic surgery; yet in the latter, when cutting operations upon the eyeball are done, we have conditions which obtain in no other portions of the body. Here we have a practically spherical, ever moving, body—not solid—but filled with two totally different liquids, one of which latter is, if lost, readily and quickly replaced without injury, and for the other, a portion of it escaping, is not restored and the damage resulting is more or less permanent. Separating these liquids from each other at the lens periphery exists but a frail and exceedingly thin membrane.

We have in addition in and around and attached to this movable organ certain muscles which, under ordinary conditions, are subject to voluntary control; yet these muscles—the six oculars proper and to which should be added the orbicularis—when an eye is opened in any operation, can and do get beyond the voluntary control of the patient and by their contractions have the power of instantaneously of not only impeding the operation, but also of destroying the usefulness of the eye.

The effects of these muscles are of course fully understood

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

by oculists, yet their power for harmful contraction when an eye is opened, is often overlooked by ophthalmologists even, and not considered at all by generalists. For instance, take the four recti, the application of their force when under tension is from before backwards, and the resistance being given by the pad of fat posteriorly, compression of the whole globe occurs, and the incompressible fluids of the eye can escape. We may and can and do keep many patients quiescent during and after an eye operation, but a certain proportion are more successful in movement than the Keely motor. The amount of ocular—muscular action in operative eye work can neither be foreseen nor prevented—we can only attempt to minimize its effect. All of this has bearing upon the operation for cataract extraction—the kind of operation and the methods of doing it.

The history and a description of the operation, and the size, shape and location of incision would fill a moderate sized volume. The incision now made by the most successful operators is wholly within the corneal limbus and includes nearly half the cornea. A large number of operators do what is called the simple operation which does not include an iridectomy. This, it must be admitted, gives, when the operation is successful, an ideal result; but there is always the risk, after the operative work is done, of a prolapse of the iris occurring, and if this does not occur at this time it may occur at any time during twenty-four or forty-eight hours afterwards. A few excellent operators do not apply dressings to the eye for half an hour after the operation, putting the eye under a probationary observance, and if a prolapse then takes place, endeavor to reduce it, and if this latter is unfavorable, follow with an iridectomy then. Some few remove the prolapsed iris later if the prolapse occurs after the toilet is made and as late as two or three days after it. Others allow the later prolapse to take care of itself and this latter leaves a more or less crippled eye.

Now it seems that this is bad surgery. It is hard to find a simile in general surgery for there is no other organ of the body like the eye either in delicacy or intricacy of its anatomy; but what would be thought of a laparotomist if he gave a chance for omentum or an important viscus to prolapse through his wound after dressings were applied, and if he did not provide against such a mishap. I insist, a so-called simple ex-

traction—that is, one without an iridectomy, is not rational for the reason given viz., the possibility and probability of iritic prolapse, and even if that does not occur, the iritis which may result and which does in many instances result from the unavoidable bruising of the iris during the delivery of the lens through the pupil which may spoil the final effect.

I insist, moreover, than an iridectomy should be done and that it should be done as a preliminary operation at least four weeks prior to the extraction. We gain by this method the removal of the risk of iritic prolapse and its consequences and we are enabled to materially shorten the time required for the extraction ordinarily, and lessen the risk of vitreous loss. We lessen the bruising to the lips of the incision, lessen the amount of irritation which the operation produces, and we improve all the conditions for immediate closure and healing of the wound. By the simple extraction method we can not completely remove cortex, or at least we do it with difficulty and only by prolonging the operation.

An iridectomy, if done at the time of extraction, increases dangers and risks; whereas, if done four or six weeks prior to the lens removal, the risk of iritic inflammation is minimized or done away with.

The average time required in my extractions is rarely over thirty seconds, and the preliminary iridectomy but a few seconds longer. I found, with the proper antiseptic preparation of my cases, that there is absolute freedom from reaction, and that immediate closure and healing of the wound takes place.

With reference to these antiseptic preparations I would say that the conjunctival sac of the eye to be operated is flushed daily with a 1 to 6000 sublimate solution and dressed with sublimate gauze until all sign of yellow secretion disappears—that is, is no longer found at the canthi on changing the preparatory dressings.

I would make the following points: That while the simple extraction, when successful, gives an ideal result, it too frequently is followed by iris prolapse, which cripples the eye more or less permanently.

That by a preliminary iridectomy we make iritic prolapse almost impossible, and if the portion of the iris excised is

small, the visual result is practically as good as that following simple extraction.

That complete removal of cortex is rendered possible by the previous iridectomy, and that the extraction is more readily and safely done, and that bruising the iris and lips of the incision are minimized and the possibilities of immediate healing maximized.

That in view of the fact that we have by the simple operation from 10 to 25 per cent. of unavoidable prolapse of iris, we have no right to take the chances of giving a crippled eye by doing that operation.

DISCUSSION.

DR. STILLSON.—I wish to heartily indorse this paper. I think of the last one hundred cases of extraction which I reported to our State Society one third were simple extractions. For many years I had made the iridectomy at the time of the operation, and then I began to make a simple extraction, as it is made by Dr. Knapp, of New York. At first I thought that the results were all that could be desired. But the unfortunate thing about this is the prolapsus of the iris that will occur in the very cases in which you do not expect it. One should think that with a neater technique, with better surroundings of the patient, more careful study of the cases we would not have prolapsus, but you may have prolapsus even in a case where you have made your incision perfectly and have delivered the lens easily. To find a prolapsus after such an ideal operation is enough to disgust anybody. And you will find that the longer you leave the prolapsus the more difficulty you will have with it. I have had such prolapsus occur without any apparent cause, and I have allowed it to go on, and by and by it increased so that I was forced to remove it. I did this in a case some four weeks afterwards, put in three sutures, taking them superficially so as not to wound the ciliary body, but to my astonishment the bulging occurred again, and then I had a badly disfigured eye, although there were no bad results to the inner structures of the eye. Now I am up to the my thirtieth case on the second hundred since I abandoned the simple extraction, and in these cases I have made a preliminary iridectomy and all those cases, fortunately, have turned out

well. I have made the second operation—that is, the extraction—as soon as five days after the preliminary iridectomy. I notice this,—the patient will not remain in bed more than a day or two after an iridectomy, and when it is properly made, that is sufficient, in fact we do not in most cases require to put them to bed at all, after the extraction, also, the patient is not kept confined as long as formerly. The second wound I make well in the cornea. The iridectomy wound is made well back so that the line of the second incision lies anterior to it. The cases in which I have resorted to the preliminary iridectomy have all resulted well. Moreover, if the lens is not entirely ripe, my experience is, that after the iridectomy the lens will rapidly ripen. The iridectomy is an operation which is generally attended with but little reaction unless you have hæmorrhage or some other complication and it is a perfectly safe operation, it can be done with little pain to the patient and does not confine him to bed. You will find that with the two operations the period of confinement of the patient will not be as long as it is under one operation without preliminary iridectomy. I wish to say, too, that I have absolutely abandoned the roller bandage. My toilet consists in washing out the eye before the operation with a $\frac{1}{8}$ per cent. boracic acid solution and the same after the operation. I also wash out the anterior chamber. Then I use enough cocaine after the operation to get the eye perfectly quiet and generally put in a little atropine to control the pupil. Then I put on a piece of gold beater's skin, leaving the internal and external canthus free. Then I cover the eye with a mask. I direct the interne or nurse, in case pain comes on after a few hours, to remove the hood and drop a few drops of cocaine solution into the corner of the eye. This will usually quiet the pain. My patients usually go to sleep after a cataract operation and sleep till the next morning. The per cent. of cases where you have iritis from cataract extraction, if you have made a preliminary iridectomy, is almost *nil*, whereas it used to be the rule to expect iritis after simple extraction.

DR. WHELOCK.—It is a matter of great pleasure to me to me to hear Dr. Stillson speak as he does about simple extraction. Nearly a year ago I heard him dilate on the beauties of simple extraction and I said then that I hoped I would live to hear him come back to sensible surgery. I do not believe in

preliminary iridectomy, such as Dr. Fryer has set forth here, except in cases of abnormal conditions about the eye, where we have reason to suspect there are deep-seated troubles; there the preliminary iridectomy is permissible to get rid of the irritation. But the objection to preliminary iridectomy is this,—that it makes two operations where one operation is sufficient, and where you have a nervous and irritable patient the dread of the second operation is a great deal more than the dread of the first one, and if you do not have an accident with the first operation, you are very apt to have one with the second. Besides, these patients are old and they do not like confinement, and the less they have of it the better. The very best reports I have seen in simple extraction involved ten per cent of prolapsus of the iris and I say that we provincial operators, we who are away from the metropolitan centers, have no business to trifle with our patients. It is very easy and nice for a metropolitan operator who operates on hundreds of cases a year to do these simple extractions and a few failures cut no figure; but I can not afford to do it; I have to preserve my reputation. A patient does not come for a cosmetic effect; he comes to get his sight back and it is my duty to stand in the relation of protector to that patient and not to try to produce a cosmetic effect unless I can accomplish both at the same time. I know absolutely that by doing a peripheral extraction I can in 95 per cent of the cases give the patient a good result; therefore it is my duty to give the patient a good result and not jeopardize his eyesight by an operation which will look simply to the cosmetic effect. Then as to the bandage. The very same principle obtains about the question of bandaging the patient's eye. It is a question of preserving the patient's sight and each one of you know from your experience that by the seventh, eighth or ninth day you are liable to have a serious result due to some injury by the patient striking his eye in his sleep; therefore, it is our duty to protect that eye, and in order to do that I think we should use the roller bandage, with a good body of cotton beneath it. I do not believe in the gold-beater's skin or court plaster, that simply serves to hold the eyelids.

DR. STILLSON.—The very reason the speaker gives for making one operation is the reason I assign for making two. He says these patients are restless, they are apt to be fright-

ened and easily alarmed. That is all true. But my experience has been that when I subject a patient to a preliminary iridectomy which does not give him much pain, he will be much better prepared for the extraction, and in my experience they behave better after the preliminary iridectomy because they see that there is very little pain. I can tell them that the second operation will hurt no worse than the first, possibly not so much, and they are perfectly willing to submit. Now as to the roller bandage; the very reason he assigns in favor of the roller bandage I assign for not using it. You do not want the patient to disturb the eye; the patient will disturb the bandage. If it is a little tight, if it does not fit well, or is too long, or if the head gets warm, or the eye begins to swell, or a few tears come, the patient will invariably get his hands up and disturb the bandage; a simple movement even of the head on the pillow will often disturb the bandage. I fix the eye so the tears can drain out, so that there will be no pressure, and in this way I avoid all danger of the patient disturbing the part. Not only that, but if there is a little pain which usually comes from the scratching of the edges of the wound against the center surface of the lid, the nurse can lift up the hood and drop in a drop of cocaine solution and stop it. So I say that the gold-beater's skin is amply adequate; the eyelid is the best splint that can be used. In the second place the less weight we have the better. All we want is rest and quiet. The hood allows the patient plenty of ventilation in and around the orbit, the tears will roll out and fall down the cheek and there is no pressure by secretions about the eye. So the Doctor's arguments against are the very ones that I use in favor of my procedures. I will say that I am done with the simple extraction. I prefer the preliminary iridectomy.

DR. REYNOLDS.—I am very sorry that I cannot adopt one fixed rule in my practice. But it is a fact, that I have frequently commenced treating a case with the intention of making a simple extraction and have ended by supplementing it with an iridectomy, and I have just as frequently started with the intention of doing a preliminary iridectomy and changed my mind when I got my fingers on the eye. I take it for granted we all see cases where we are satisfied that a preliminary iridectomy is desirable. I have seen preliminary iridectomy done just within the scleral margin followed by nothing

peculiar and the subsequent extraction, the section being made within the limbus of the cornea without any accident, followed by bulging of cicatricial tissue. The cicatrix in such cases undergoes atrophic changes and it becomes weaker. As it does after operations for the radical cure of hernia so it happens with these two wounds in the wall of the globe, the cicatrization of them is not a permanent final condition. That does not always happen, but sometimes. As to the manner of dressing, I would like to say that I have not used the bandage for more than twenty years. I am afraid of it because if the patient happens to put his hand to his face and relax the bandage he is apt to cause trouble; the pulling on the bandage by moving his head is apt to disarrange the parts and disturb the union of the wound. In reference to prolapsus of the iris I believe if we could only eliminate the element of pressure in the dressing and restrain the patient in his movements of the eye, we could reduce the frequency of prolapsus. I lay a little film of cotton well about the lash and then I take strips of rubber plaster a quarter of an inch wide cut short, just running from the brow fairly upon the zygomatic arch and lay them at short intervals, using three or four strips, and taking great pains to leave the inner and outer canthus free and exposed to view. But I prepare my patient differently, I flush the eye not with a one grain to the ounce solution, but with a ten grain to the ounce solution of boracic acid before operating, and the reason I do it before operating is because my cocaine will not produce anæsthesia if I use the bichloride of mercury first. After that I flush the eye with bichloride of mercury solution, one-sixteenth of a grain of bichloride of mercury and ten grains of chloride of sodium to the ounce of distilled water. This solution I use in washing the part after operation. After I am done flushing, five, ten or fifteen minutes after the operation is completed and I see no floating shreds of cortical substance, and there is no imprisoned portion of iris or capsule lying in the lips of the wound, and the pupil has contracted normally, then I instill a solution of eserine, one grain to the ounce of water, and to keep it from putrefaction I add one-quarter of a grain of carbolic acid, which also diminishes the irritation which the eserine sometimes provokes. With this sort of treatment I am able to secure perfectly satisfactory aseptic conditions. The plaster places my patient's eye in a good position and

keeps it so permanently. Of course there are difficulties which arise and which will remind us that we have no absolutely ideal method of procedure, but to my mind this is the safest.

DR. REYLING.—I have made thirty cataract operations, two of them with a preliminary iridectomy. In the twenty-eight cases in which the simple operation was done I had five prolapsus. The first one happened about five hours after the operation. The woman had a good deal of pain and I found the iris was prolapsed. I tried to replace it and more iris came out, so I removed it. Of the four remaining cases one prolapsed about the third day, one the second week, and the other a week after. In one of the cases I tried instead of replacing it to allow it to go on without doing anything and inflammation set in so that I had to remove it. The wound was not healed and I enlarged the opening and removed the prolapse and some little shreds that were entangled in the wound. After that I washed out the wound with an antiseptic solution and applied a bandage. At that time I used bandages. The two last operations I made with preliminary iridectomy. About preparing the eye for an operation for the removal of cataract or any other operation, I always, if the eye is healthy and there is no conjunctivitis, thoroughly wash the eyes with bichloride 1:5000, and not only wash them but I turn out the lids and thoroughly flush them. If there is conjunctivitis I never operate until that is cured. I have stopped the use of the bandage and I have had better results since. In place of using gold-beater's skin or cotton I use a plan of Dr. Knapp's, he just lays a piece of corrosive sublimate gauze on the eye and then places a few strips of adhesive plaster across. My practice is small, but in the Manhattan Hospital we had from ten to fifteen cases every week and there the simple extraction is made and with pretty good results; very seldom there is a prolapsus of the iris. We had one surgeon who was not very careful about antisepsis and he was the only one who, as a rule, had bad results, but all the rest used antiseptics and hardly ever had suppuration after an operation.

DR. TIFFANY.—I certainly do not agree with Dr. Fryer in all he said as to the technique of the operation for senile cataract. I disagree with him in the size of the section, in that it should not embrace more than is absolutely necessary (the Doctor speaks of one-half the cornea); if the incision is small

we are more apt to have union by first intention. As to waiting for half an hour after the operation to see whether you will have a prolapsus or incarceration of the iris, that would be unscientific. However, I believe that it has been suggested by a very prominent oculist, a member of the American Medical Association. In fact, he speaks of leaving the eye unbandaged. Now as to the simple operation or that with iridectomy. I am something like the Frenchman, I respect the iris and I never cut the iris unless I am obliged to; it is only in complicated cases that I would make an iridectomy and certainly I never would make a preliminary iridectomy unless it would be in cases of complication where there was iritis and where the cataract was not fully developed. Then I would make it. While I was in Paris the last time I spent several weeks, in fact months, with Dr. Panas who, perhaps, makes the operation oftener than any man living, as he is at the head of the largest institution in the world, and I have watched him operate month after month and never saw him make anything but the simple operation; I have watched his results and they have been most excellent. I have never seen an incarcerated iris nor prolapsus and in all the cases the pupil was central. Dr. Panas always washed the anterior chamber with boracic acid solution, I neglected to say. In Hansen's clinic at Copenhagen they said they would not dare to throw any solution into the anterior chamber; they would be afraid to do it on account of the pressure, which might produce iritis. In regard to a coloboma being as good as a circular pupil, certainly such a statement we can readily see can not be true. If it was true then surely Nature would give us elongated pupils instead of circular ones. As we all know the lens does not reflect light equally in all its parts; it is only the central portion of the lens where the rays of light come to a focus properly. So that the circular pupil must be the better. There is no pain really in the extraction of the cataract unless you make iridectomy. You can not anæsthetize the iris completely with cocaine as ordinarily used and therefore there is some pain. I used to make iridectomy, but never make it now unless obliged to. I always replace the iris with a curette, smoothing it back into the anterior chamber and seeing that it is not incarcerated, especially at the angles of the wound, see that the lips of the wound are in perfect apposition and that there is nothing there

to prevent the healing by first intention. The old practice was to close the eye and not open it for several days afterwards. You were allowed to wash the margin of the lids and keep them clean, but that was all. I always open the lids the next day; I open them every day and watch the eye and see how it is getting on and put in eserine every day when necessary, seeing to it that the pupil is contracted and that there is no prolapsus or incarceration. In dressing I am careful to flush the conjunctival sac with the bichloride solution. I do not use the roller bandage; never used that. All the pressure we want there is the normal pressure of the lids; that is brought about by the dressing that is used by Dr. Knapp,—the bichloride gacze. I strap this on with ordinary adhesive strips, one strip across the brow, another across the cheek, taking care that there is no pressure upon the eye. Iridectomy may make the operation safer, and I suppose it is safer if your hand is not entirely under your control. If you do not make the operation very often make a preliminary iridectomy or an iridectomy at the time you extract; but if you have had an extensive experience, if you have your hand thoroughly under your control and particularly if you are ambidexter, I think the simple operation is just as safe and it certainly brings about better conditions and appearance of the eye.

DR. KEGLEY.—I just wanted to say that my experience was that there is greater difficulty with the simple operation as the iris retains so much of the cortical substance. I would like to know the manner in which others get that out of the way. It comes out very easily if iridectomy is performed. I have had great difficulty in removing it just when I wanted to.

DR. BARCK.—I am sorry that I did not hear the paper read by Dr. Fryer. I would only like to make one remark in regard to the statement by Dr. Tiffany that Dr. Panas has had no prolapsus. I do not know anything about his statistics, but if he has had no prolapsus at all it is absolutely marvelous, as to my knowledge there is no other operator living who has not from time to time had secondary prolapsus. The average is from 4 to 6 per cent., and I think in the statistics mentioned by Dr. Knapp even 9 or 10 per cent.

DR. TIFFANY.—I did not say that he had no prolapsus, but that during the time I was attending his clinic for several months no case of prolapsus came to my knowledge.

DR. FRYER.—I would like to reply to the gentlemen in the order in which the discussion took place. One of the gentlemen spoke of the confinement of the patient after the operation. This is really unnecessary after a preliminary iridectomy. I do most of my preliminary iridectomies in my office. There is little necessity for confinement after an operation which takes only twenty or thirty seconds, the time in which the extraction is made. The patient need not go to bed at all. I prepare my cases for operation, using for several days, sometimes for two or three weeks, an antiseptic dressing. The rationale of this has been shown by Dr. Welch, of the Johns Hopkins University of Baltimore, who found that where the surgeon makes the surface aseptic that he does not really interfere with the life of the microbe. After thorough cleansing of the surface with a sublimate solution if you scrape off the epithelial cells and put them into the culture tube you get no growth, but if you precipitate the sublimate with the bisulphide of ammonium and then expose the epithelium in the culture tube you get a growth. This shows that the sublimate has simply for the time being rendered these microbes inert. I believe the same thing takes place in the conjunctival epithelium and if you apply a solution several days before the operation the microbes in the epithelial cells are quiescent, and do no harm. Several gentlemen spoke of boracic acid. The bacteriologists tell us that boracic acid is no antiseptic and if you rely upon boracic acid as I understand you are doing, you have a very slender support; it is practically not a germicide and you can not make it strong enough to make it so. In regard to making two operations, a preliminary iridectomy and the extraction, Dr. Stillson said that, in place of being difficult this is an advantage, that you get a knowledge of your patient's character, and you know how he will behave. This is true. In regard to not making the iris anæsthetic, you can do it, and most of the gentlemen who remember Koller's first statement will remember this. I talked with Dr. Koller about it and he states that you can make the iris free from pain as you can the cornea by using a solution three or four times, making it weak so it will not interfere with the integrity of the cornea and making the applications far enough apart. About the prolapsus in simple extraction, the best that I could get from the statistics that have been given, from the very best

operators, is 25 per cent. And I do not see how you can reduce it very much; but if it is only 10 per cent. or 6 per cent. as Dr. Barck states, that is a very serious factor. I have seen a number of the results of the operations of the very best operators living—I do not care who they are, there are none better than whom I quote—and I know that they give twenty-five per cent. as the percentage of prolapsus of the iris after the simple operation of extraction. Dr. Reynolds stated that he had no rule in making an operation. Well, as to going by a general rule, when you get to the operation, you can not do it—you can not make a general rule—except to avoid risks as far as possible; but I believe the time will come when the practice of making the simple extraction will be largely abandoned. In regard to cicatricial tissue, practically we have no cicatricial tissue if we get immediate union; at any rate, there is not a zone of cicatricial tissue. Dr. Tiffany stated that my incision takes in half of the corneal periphery. I did not make use of such an expression. I said nearly half and I took it for granted that incisions made by the best operators to-day extend at least over two-fifths of the corneal periphery if they want to bring through a large lens. It is not quite half. The great error in operating often is that the incision is made too small. Dr. Knapp in his descriptions speaks of including practically half the cornea. If Dr. Panas is lucky enough to have very much less prolapsus than others I can only say it will not be long before he will have a series of them which will bring up his average to that of the other operators of the world.

DISCUSSION OF DR. W. H. BAKER'S PAPER, WHICH APPEARED IN THE JUNE NUMBER.

DR. FRYER.—This matter of heterophoria should be considered as Dr. Bulson said in regard to the correction of hypermetropia and we should consider the work in relation to each individual. It is a fact that a man constantly using his eyes for near work should have in reserve at least two thirds of his muscular power and in giving correction by prism or operation we must remember this. This matter of so called partial tenotomy I insist is a failure. There is no such thing as a partial

tenotomy. As a fact we have in the tendons a most unyielding tissue and unless a tendon is divided entirely there is no effect. It is absolutely impossible to get an effect without the whole tendon is divided, I care not what Dr. Stevens or any other man says to the contrary. I have seen cases in which 12, 14 or 20 so-called partial tenotomies had been done. In the West here most of us are satisfied with one or two at the outside. There are very few patients in the West who will allow more than one or two. The only way you can make a graduated tenotomy is not to separate the tendon from the conjunctiva but to get any effect you must separate the tendon from the eyeball.

DR. COLBURN.—If the question of graduated tenotomy was under discussion I should take issue with the gentleman. I have had occasion to do it quite a few times and I have had a very decided effect, but it must be intelligently done.

DR. ALT.—Do you mean a permanent effect?

DR. COLBURN.—A permanent one. It can not, however, be done without experience. I can look over my earlier work and see where I made many errors in my attempts to do what was called and supposed to be graduated tenotomy, but I know it can be done and in many defects, in fact in every case of strabismus is of great benefit. I have never made what is known as a complete tenotomy. I can get good results with partial or graduated tenotomy and have done so for several years in all my strabismus operations by paying attention to the individual, to the tendon, to the check ligament or the capsule. I know it can be done; I have demonstrated it time and again; the effect of graduated tenotomy is a fact, it is not a fallacy, and its utility is very great. In regard to this I think just as I do as to the correction of small errors of refraction. It must be done with care, with intelligence and after all other means of correcting such cases have been tried. But it has an effect and it seems to me we are belittling our profession when we claim it has not and that we are throwing discredit upon the action of men who have done good service in this field of work. The case related in the paper is certainly very interesting, but it belongs to that numerous group of hysterical cases; the tenotomy may not have had a shadow of influence in it; it may have influenced it to some degree afterwards; the tenotomy may have been done by a man who was not competent

to do it; we can not tell that, but the fact that the patient was better afterwards does not show that the trouble was not corrected to a certain degree. I have seen some cases of strabismus where a complete tenotomy has been made and the eyes put in apparently good condition, where, within a few months, the eyes were crossed again, and cases in which an advancement had been made and in a few months its effect was lost.

DR. FRYER.—What I wish to insist on in regard to the so-called graduated tenotomy is this. Dr. Stevens divides this central part of the tendon tissue leaving two lateral bands attached to the eyeball. These are just as unyielding as the part that is separated, thus you can get no permanent effect. I do not mean to say you can not get a minimum effect, but I say it is absolutely impossible to get any sufficient effect unless the entire tendon is divided.

DR. COLBURN.—Dr. Stevens does not operate that way.

DR. FRYER.—Then he has changed his method as originally described.

DR. COLBURN.—I do not think he has been very clear in his description. Many operators have been very deficient in their work, and I have seen such bad work and have done some myself sometimes, but I know now how to do a graduated tenotomy.

DR. HECKLEY.—Some two years ago I spent two months in Dr. Stevens' office and he described to me how he did the graduated tenotomy, but standing over him I failed to see him do it as he had described it; it looked to me as if he cut the tendon off. In fact, in some case, one day he would do a graduated tenotomy, so-called, and the next day he would cut the tendon off.

DR. BAKER.—I do not think I made any misstatements. I have had experience in graduated tenotomy and I think that the muscle strengthens, and I do not see why it should not strengthen after graduated tenotomy, because cicatricial tissue is formed which is unyielding and by contraction shortens the muscle; I think I am right in that statement.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

AUGUST, 1897.

NO. 8.

ORIGINAL ARTICLES.

CREDÉ'S METHOD FOR THE PREVENTION OF
PURULENT OPHTHALMIA IN PUBLIC
INSTITUTIONS.¹

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IN ORDER to appreciate the importance of this subject it is necessary to recall very briefly the number of persons in this country who have been made blind by purulent ophthalmia of infancy, and also to estimate their cost to the State. In 1890 there were in the United States 50,411 blind persons of all ages. Now it will be remembered that Magnus and others who have studied carefully the causes of blindness among several thousand individuals of all ages found that in about 10.8 per cent. this condition was due to ophthalmia neonatorum. Or, if we call that 10 per cent. for the sake of moderation, we have in this country, in round numbers, at least 5,000 persons blind from that disease. If the average cost of these per capita is about that of paupers, that is, about \$125 per year, this means that the country expends for them about \$625,000 annually. Now if it were possible within one generation to reduce the number of those blinded by the dis-

¹Paper contributed to the Transactions of the American Ophthalmological Society—Meeting 1897.

ease in question from 5,000 to less than 350, and then indirectly to only 15 or 20, by the invariable use of one remedy which could be used by any intelligent nurse—and which is, practically, perfectly safe—then it would seem worth while to use that one remedy invariably, at least until there was reason for changing to a better one. Or, on the other hand, if, by not using this remedy an unnecessary cost were imposed upon the State, to say nothing of the suffering of the victims of such negligence, it would seem that it was the right and duty of the State to enforce such treatment.

The first object of this paper is to show that the application of a single drop of a two per cent. solution of silver nitrate to the eyes of children as soon as possible after birth, as recommended by Credé, is the best means thus far known of preventing this purulent ophthalmia of infants, and that a large experience shows that when no such precautions are taken, about fifteen times more children develop that disease than when the silver nitrate is used. It is not contended here that this treatment should be enforced invariably in private practice—however strong the reasons for that may be—but only some reasons are given why, in all institutions supported by public funds, this should be made obligatory either by special State law, or by local regulation.

As to the first question, concerning the comparative value of silver nitrate and of other remedies, that is not a matter of theory, but simply a question of fact established by the combined experience of a large number of obstetricians whose unusual opportunities for observation, both in institutions and elsewhere, have made them most competent to speak on this point. Of all the numerous statistics and published opinions which have been gathered at various times by different authors the most recent and complete lists relating to this important matter were published last year in the *Archiv für Gynäkologie* by Kostling, of Halle.

The accompanying table is made from his lists, with one or two additions, and includes all of the writers who state the number of children who came under their observation and also the percentage of those who developed ophthalmia of infancy.

TABLE I.—Statistics Concerning the Frequency of Purulent Ophthalmia of Infancy Before the Use of the Credé Method.

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Credé, Leipzig, 1874-80.	2266	9.97	Arch. f. Gyn., xvii, S. 50.
Grenser, Dresden.	2801	13.6	Haussmann, Deutsche med. Wochenschr., 1879.
Osterloh, Dresden.	1106	10.5	" "
Winckel, Dresden.	1029	15.4	" "
Ahlfeld, Marburg, 1867-82.	2191	5.2	Zeitschr. f. Geb. u. Gyn., xiv.
Haidlen, Stuttgart, 1877-80.	1476	11.65	Centralbl. f. Gyn., 1883.
v. Saxinger, Tübingen.	1980	6.1	v. Saxinger, Mittheil. aus d. geburtsh. gyn. Klinik zu Tübingen, 1884.
Dethlefsen, Kiel, 1872-82.	1212	10.31	Diss Kiel, 1885.
Dyrenfurth, Bresl. Hebammen-Anstalt.	1039	18.5	Haussmann, Deutsche med. Wochenschr., 1879.
Königstein, Wien, 1881.	1092	4.76	Allg. Wien. med. Zeitg., 1882
C. Braun, Wien.	290	7.2	Haussmann, Deutsche med. Wochenschr., 1879.
" "	260	4.0	" "
Artemieff, Tiflis, 1873-83.	1025	2.9	Arch. de Tocologie, 1887.
	17767	9.24	

It will be seen that previous to the introduction of Credé's method the record of over 17,000 births, tabulated by twelve observers, shows that over 9 per cent. of children developed ophthalmia neonatorum. On the contrary, after the introduction of Credé's method the records of over 24,000 births, by twenty-six observers, indicate only .65 per cent. In other words, the proportion was nearly fifteen times as large without the Credé method as with it. Attempts have naturally been made to obtain the same results with other agents and the relative success with these is shown in Kostling's list. It will be seen that all of these methods give a larger percentage of ophthalmia than does that of Credé's, with possibly the exception of solutions of sublimate. A digression might be

made here to show why this last treatment is inferior to that suggested by Credé. The stronger solutions—a tenth of one per cent., are very irritating to the conjunctiva, and obstetricians like Widmark, Fleischhauer and Olshausen, after extensive trials, have abandoned all sublimate solutions to return again to the nitrate of silver. Therefore, until the evidence of those who have used sublimate is more abundant and more favorable that must also give way, leaving no form of treatment with a record of efficiency equal to that of the 2 per cent. silver nitrate.

But are there not objections to the plan recommended by Credé? Yes; and if these objections are stated in turn, each with its full force, and the natural answer to it is considered, it will at once appear how weak these are in comparison to the reasons for still keeping to that method. The first and most important objection is the mere doubt in the minds of some, as to whether or not a two per cent. solution of silver nitrate may in some way be harmful, possibly dangerous. The simple reply is that it is not. When a single drop of the solution is used, as recommended by Credé, the procedure is practically as free from danger to vision as any treatment can be.

The fact is, that among the 24,724 records of births collected by Kostling in which the obstetricians have used the two per cent. solution of silver nitrate, and among the many more thousand births, probably, in which the same solution was used and in which any bad results would have been promptly published if they had occurred—among all these it is possible to find reference to four cases only in which any disagreeable effects could be attributed to this method. It should be remembered also how much care has been given to ferreting out any such cases of injury from the silver nitrate.

For example, in order to gather data on this point (as well as on others relating to ophthalmia of infancy) Cohn sent a letter to the leading ophthalmologists of Germany asking, among other questions, if any unfavorable results from the use of Credé's method had come under their observation. He received replies from one hundred and ten of the heads of ophthalmological clinics and others with whose names we are most familiar, and among them all discovered two cases in which there was even a question as to the disadvantages of the method. In both of these it was asserted that ulceration had followed the application of "drops" immediately after birth, but in neither instance was it possible to ascertain the strength of these drops nor how often they had been used.

TABLE II.—Statistics Concerning the Frequency of Ophthalmia Neonatorum After the Use of the Credé Method.

<i>Authors.</i>	<i>Number of Cases O served.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Credé, Leipzig.	1160	0.086	Arch. f. Gyn., xxi.
Zweifel, Leipzig.	1724	0.2	Lehrb. d. Geburtsh. III Aufl.
Leopold u. Wessel, Dresden.	1002	0.69	Arch. f. Gyn. xxiv.
" " "	1100	0.0	Centralbl. f. Gyn., 1885.
" " "	522	0.0	Arch. f. Gyn., xxiv.
Brose, Berliner Frauenkl.	460	1 5	Zeitschr. f. Geb. u. Gyn., x.
Gusserow, Charité.	1110	0.45	Korn, Arch. f. Gyn., xxxi.
Hummerich, Charité.	1007	1.39	Ref. Centralbl. f. Gyn., 1885.
Haidlen, Stuttgarter Hebammenschule.	978	0.1	Centralblatt f. Gyn., 1883.
Bayer, Stuttgarter Hebammenschule.	361	0.0	Arch. f. Gyn., xix.
Krukenberg, Bonn.	703	0.56	" " xxii.
Kaltenbach.	234	0.85	Nebel, Zeitschr. f. Geb. und Gyn., xiv.
Feis, Gottingen.	452	0.0	Centralbl. f. Gyn., 1892.
Caro, Königsberg.	1254	1.44	Diss. Königsberg, 1887.
Beumer u. Peiper, Greifswald	109	1 7	Arch. f. Gyn., xxiii.
" " "	107	1.9	" " "
Karafiath, Budapest.	130	0.72	Ref. Centrabl. f. Gyn., 1884.
Königstein, Wien.	1300	Knapp 1.0	Allgem. Wiener med. Zeitg., 1882.
Felsenreich, Wien.	500	0.4	Arch. f. Gyn. xix.
" "	3000	1.93	" " "
Konrad, Grosswardein.	714	0.14	Ref. Centralbl. f. Gyn., 1889.
Artemieff, Tiflis.	153	0.6	Arch. de Tocologie, 1887.
" "	204	0 3	" " "
Mendes de Leon, Amsterdam.	870	0.8	Ref. Diss. Fleischhauer, Halle, 1884.
Rudin, Charité, Paris.	675	0.15	Arch. de Tocologie, 1892 p. 877.
Rivière, Bordeaux.	403	0.5	" " "
Vinay, Lyon.	400	0.0	Puech, Arch. de Tocologie, 1890, p. 72
Garrigues, New York.	351	0.0	" " "
Charles, Lüttich.	377	0.265	Ref. Centralbl. f. Gyn., 1888.
Fehling, Basel.	3002	0.19	
Fehling, Halle,	361	0.83	
	24723	0.655	

One Per Cent. Solution of Silver Nitrate.

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
v. Hecker, München.	133	3.0	Arch. f. Gyn., xx.
Schmitt and v. Weckbecker Sternfeld, München.	1090	1.844	Centralbl. f. Gyn., 1883.
	1223	2.422	

TABLE III.—*Carbolic Acid Solution.*

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Königstein, Wien.	1541	2.0	Allg. Wien. med. Zeitung 1884.
Krukenberg, Bonn.	82	13.4	Arch. f. Gyn., xxii.
	1623	7.7	

Sublimate Solutions.

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Stratz, Berl. Frauenklinik.	965	0.6 (0.1 per cent. solution)	Centralbl. Gyn., 1895.
" " "	460	0.43 (0.02 per cent solution)	" " "
Fritsch, Breslau.	486	0.4	Stratz, Centralbl. f. Gyn., '85.
v. Erdberg, Dorpat.	450	0.43 (Sublimate 1:7000)	Diss. Dorpat, 1892.
	2361	.47	

Sterilized Water.

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Abegg, Danzig.	2266	3.0	Arch. f. Gyn., xvii.
Schirmer, Erlangen.	50	0.5	Centralbl. f. Gyn., 1882.
Grünwald, Petersburg.	485	1.66	Monographic, 1884.
Kaltenbach, Halle.	85	1.176	Nebel, Zeitschr. f. Geb. und Gyn., xiv.
Cohn, Berl. Frauenkl.	200	4.0	Centralbl. f. Gyn., 1886.
" " "	653	1.9	" " "
Korn, Dresden,	1000	0.7	Arch. f. Gyn., xxxi.
" " "	95	6.0	" " "
Hofmeier, Würzburg.	354	0.28	München. med. Wochenschr. 1890. (One case of corneal ulceration among these).
Mermann, Mannheim.	400	0.25	Centralbl. f. Gyn., 1892.
" " "	200	1.0	" " "
Rivière.	45	17.0	Arch. de Tocologie, 1892, p. 877.
	5823	3.122	

Iodine Trichloride.

<i>Authors.</i>	<i>Number of Cases Observed.</i>	<i>Percentage of Ophthalmia Neonatorum.</i>	<i>References.</i>
Buchholz, Dorpat, I, 4, '92 bis I, 4, '93.	201	1.0	Diss. Dorpat, 1833.
Keilmann, Dorpat u. Breslau	500	1.4	Schles. Gesellschaft f. vaterl. Cultur., 25, I, 1895.
	701	1.2	

From these tables it will be seen that we have here the results of various plans adopted in over 54,000 cases divided as follows:

OPHTHALMIA OF INFANCY.

17767 births with no treatment, - - - -	9.2 per cent.
24724 births with 2 per cent. solution of silver nitrate,	0.65 per cent.
1223 births with 1 per cent. solution of silver nitrate,	2.4 per cent.
1623 births with carbolic acid solutions. - - -	7.7 per cent.
965 births with 0.1 per cent. solution of sublimate,	0.6 per cent.
1396 births with other sublimate solutions, - -	0.4 per cent.
6155 births with sterilized water, - - - -	2.8 per cent.
701 births with iodine trichloride solutions, - -	1.2 per cent.

Two other cases have occurred in this country. One is published by de Schweinitz in the *Medical Record* of 1891, and the other by Pomeroy in 1887. Both of these presented the rather peculiar feature of bleeding following the application of the silver nitrate. In de Schweinitz' case a two per cent. solution was used first and after that one of four per cent. As this would never be applied by any one following the Credé method, it should be excluded from the present category. There remains only the case reported by Dr. Pomeroy. With this child only a drop of a two per cent. solution was used, but there followed "a slow persistent oozing of blood startling to observe." There is every reason to suppose that the child was one of those individuals with a natural tendency to bleed freely. Indeed, among so many thousand or even hundreds of thousands of children thus treated it would be strange if some such bleeding from a usually insufficient cause were not met with. It should be remembered also that nearly every remedy which has been proposed to take the place of silver nitrate has been followed by disagreeable results. Even after the use of sterilized water some irritation and, once at least, corneal ulceration has followed (Hofmeier), probably due as little to the water as the other cases were to the silver nitrate.

OBJECTION 2.—If not dangerous, it is at least painful. No, that is not necessarily the case. Since Credé's first article on the subject, cocaine has been given to us. Of course it is impossible to use cocaine first and immediately after apply the silver nitrate, as a precipitate would be formed, but it is possible to inject first a few drops of cocaine, and though the tears at once wash this out the anæsthetic effect remains and if the silver be used then the pain produced is but very slight.

OBJECTION 3.—The procedure does not invariably prevent the disease. It is true that in a very small percentage of children the remedy is ineffective and in spite of it they develop the disease. But that ratio, taken from a list of more than

24,000 cases, is 0.65 per cent. Is not that degree of efficiency quite as high as that of other drugs which we call specifics? With the same reasoning we would have to give up the use of opium, quinine and many of the most valuable remedies.

OBJECTION 4.—It requires extra care on the part of the obstetricians. But what is the obstetrician employed for, if not to give the child the best attention possible?

OBJECTION 5.—Some discomfort and possibly some pain is given to the children, with consequent anxiety to the parents.

In a word, the child is put to some inconvenience. But which would the child prefer—such inconvenience, or the possibility of life-long blindness? And as to the parents, they have only reason to congratulate themselves that a method is now known whereby we are assured the practical safety of so many of the eyes formerly sacrificed. These objections, then, resolve themselves into the question as to which is the worse, annoyance to the physician and to the children, or life-long affliction like this, though it be to comparatively few. It must be admitted that the method recommended by Credé is far from perfect and not always reliable. A better one may be found to-morrow, but thus far, in the opinion of those most competent to judge, it is the best. But admitting all this, and that Credé's method is the best, why should it be made obligatory, either by general State law or by local regulation?

There are several reasons for this. The first is the right which the State has to protect itself against unnecessary taxation. Children born in public institutions are specially under its care. It has as much right as an individual to say what treatment they shall have, and if Credé's method is the best now known, these children should invariably have the benefit of it. If a better method is discovered, as we hope it may be, it would be easy enough to change the regulation or the law.

Second, it is not only the right, but the duty of the State to compel the use of this one exclusive method of treatment—which experience has proved the best—for the same reason that it is its duty to enforce vaccination.

The danger from contagion is of course much less, but when we remember that these blinded individuals must be dependent almost invariably a whole life time for their support, the cost in the end is greater than that caused by small-pox.

A third reason is that obstetricians have shown themselves slow to adopt this or any other plan for the prevention of purulent ophthalmia. The truth is, as shown by May, that about as many cases of this disease are recorded in hospital reports now, as there were ten or fifteen years ago. There is also reason to think that some teachers of obstetrics do not lay sufficient stress on the necessity of preventive treatment.

Burnett says that "in more than thirty standard works on obstetrics in English in the library of the Army Medical Museum there were only four which considered the preventive measures of which we have spoken. These were the *Encyclopædia of Obstetrics and Gynæcology*, and the *Treatises of Barnes, Lusk, and Gazeaux and Tarnier*. In only six others—and they were mostly old works—was there any consideration given to the treatment of this disease when once it had been established."

In spite of all that has been written, many obstetricians still confess that they use such precautions seldom or never, and so children continue to increase the army of victims made blind by carelessness or ignorance. But it happens in certain instances that the practitioner is morally sure that no such source of contagion exists on the part of the mother, and it is naturally asked whether the child of such a mother should be given even a little pain or discomfort and the parents caused any anxiety by the redness of the eyes?

The reasoning is perfectly good. But in such a case it is better for the physician to take the responsibility himself, and pay the fine for breaking a law, if he must do so, than to have no such provision at all. Laws must be made for the average and not for exceptional individuals. It will be observed that the reasons given for making the method obligatory apply not only to public institutions but with equal force to private practice. That would be the logical result and I shall mention in passing the enormous advantage gained if the Credé method or some other equally efficient were thus made universally obligatory. For the present, however, it is better to attempt making this apply to public institutions only and for the following reasons:

First, it would probably be impossible to inaugurate such a universal system at once. The American citizen resents

paternalism in government and wishes to have his own children treated in his own way even if that is the very worst.

Second, if the method is established in public institutions first the laity will gradually learn its advantages and be apt later to ask that their children receive as intelligent treatment as is given to paupers.

Third, it is better to restrict the treatment to public institutions for the reason that an opportunity is still left in private institutions and private practice for experimenting with other methods, whenever the obstetrician is so inclined and the parents are willing to permit it.

It is true, that if Credé's method were made obligatory in public institutions only a very small part of the population would be affected by it, but if that led, as it probably would, to its universal adoption, it is easy to calculate how great the gain would be in the end. We have seen already that a moderate estimate places the number of blind from this disease in the United States at a little over 5,000, but if the Credé method or some other equally effective were invariably used, that number would be reduced in one generation to about 331, or say 350 at the outside. Now it is also shown by the reports of a large number of ophthalmic hospitals (Cohn) that when these cases, already fully developed but without ulceration, have the benefit of methods of treatment now well known, only about five per cent. of them progress to ulceration with consequent impairment of vision. It is probable that most of such cases would be seen in this early stage, not only because the attention of the public had been directed to the importance of the subject by this law, but also because there already exists another law which compels midwives to report these cases to some qualified practitioner soon after the condition is recognized. This latter law already exists in thirteen States having a population of over 34,600,000. If, now, in another generation only about three hundred children or less developed the disease at all, and if these received proper attention in so early a stage that only five per cent. of them had ulceration of the cornea, there would be, as is evident, not 5,000 cases as we have now, but only eighteen cases in the whole United States, with the corresponding lessening in suffering and cost. Of course this is but an estimate, and it makes but little difference whether it be eighteen or twenty-five, for the practical fact is

that an enormous reduction would be possible. So great would this be as practically to realize for this country what Cohn quotes from Prof. Dimmer as the concluding sentence of his recent exhaustive monograph on the subject, namely, "purulent ophthalmia of infancy can and must be wiped out of every civilized country."

So much for the advantage of Credé's method, and what should be obligatory at least in public institutions. Two more should be added concerning the attitude of the profession in regard to making it obligatory. One of these concerns the obstetrician and the other the ophthalmologist. As to the obstetrician, those who do use it in institutions would probably have no objection to making it obligatory there until a better method were found.

On the other hand, we often meet a practitioner whose experience is comparatively small, generally without the advantage of practice in institutions, who reports having attended a few hundred cases—number usually indefinite—during a certain period of years, and, having met with but one or two instances of ophthalmia of infancy, he demands indignantly why for that small number, so many should be subjected to such great inconvenience. The evident reply is, that either his experience has been exceptionally fortunate, or that the bad reports have been omitted or forgotten. The blind asylum too often has records of his cases, and obligations, legal or otherwise, should be imposed to control just the class of which he complains.

Finally, it would seem that a great responsibility as to the question rests on ophthalmological societies and on individual ophthalmologists. For the one who places any obstacle in the way of this measure owes it to himself as well as to the profession to state clearly the reasons for this, if, in any case, any can be found after he has really studied the subject thoroughly. The subject of the prevention of blindness from ophthalmia neonatorum has been carefully considered by the Ophthalmological Society of the United Kingdom, by the Ophthalmological Section of the International Medical Congress of 1890, and by the Société Française d'Ophtalmologie, and American practitioners in this department can not be tardy in calling the attention of their professional brethren to this much needed reform. I think, too, that even the evidence

which it is possible to produce in a brief sketch like this, is sufficient to show that if legislators will compel obstetricians in public institutions to employ this method invariably, it will prove to be the first step in a decided progress towards the relief of misery and the lightening of an unnecessary burden to the State.

CONGENITAL NYSTAGMUS.¹

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PERSONS afflicted with congenital nystagmus occurring in conjunction with vision which is normally fair but for the spasm of the recti muscles, or which can by the aid of proper correcting lenses be raised to fair vision, may be greatly improved in personal appearance, and the nystagmic movements lessened or totally suspended by relieving the abnormal relation existing between the motor muscles of the eyes themselves, or between them and the soft and bony structures in which they are suspended. In a limited number of cases the correction of the errors of refraction, which have usually been high, have been sufficient to do away with the tremulous or oscillating movement.

My special interest in this class of cases arose in the following manner: In 1887 two children came to my clinic who were totally color-blind and nystagmic. The elder, a girl of 14, was very clever at sorting worsteds as to value, but totally unable to determine their color. The brother, 12 years of age, could not sort the colors, and was less accurate in arranging them in value. They had no errors of refraction, and their vision was about $\frac{20}{40}$ in good light. Their mother stated that they were noticed to have unsteady eyes soon after birth, but had had no illness except the usual attacks of colds and indigestion of childhood. They were blonds, but not albinos, strong, bright and healthy. The mother had taken them to

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

several physicians, seeking relief for the nystagmus. The prognosis had been so uniformly unfavorable that she had long ago despaired of giving them relief. And they were now consulting me for a slight conjunctivitis. The children did not know that they were color-blind, and I discovered it by accident.)

These cases called to my mind the papers by Oglesby (Brain, 1880), and the criticisms of his conclusions by Snell.

The observations made by Snell of miners suffering from nystagmus, led him to the conclusion that acquired nystagmus was due, among miners and others, to the awkward and unusual position in which they were forced to place themselves while at work, and the long-sustained and unaccustomed position of their eyes during their shifts of labor, and not to functional or organic diseases of the brain. In my observations on cases of squint due to contracted or undeveloped check-ligament and the nystagmic movements which attend the effort to overcome the inhibition of the ligament, the irregular movement has been greatest at the extreme limit of forced abduction and the eyes have been at rest, or nearly so, when favoring the contracted facia. In watching congenital nystagmic patients it has been noticed that there is one position that their eyes assume, which affords them improved vision, and obtains comparative quiet. In all other positions the eyes move with greater rapidity, and longer and more irregular excursions. And in the extreme opposite position, the visual lines are widely removed from their habitual relation, and give the sensation of confusing diplopia and greater blurring of vision. It occurred to me that I might at least be able to bring the position of rest to the median line, correct the eccentric position of the head, and, possibly, relieve the oscillating movements throughout the entire range. This I endeavored to accomplish, first studying the head and eye movements in all acts of seeing, determining their position of complete rest and acute vision. Then studying the range of adduction, abduction and circumduction, and if present, rotation. This was done with the eyes used singly and together. To illustrate: Maggie, aged 14 years, nystagmic from birth, with head posed to the left and eyes directed to the right, vision = $\frac{20}{11}$; head erect and eyes directed in front, vision = $\frac{20}{100}$; head to the right and eyes directed to the left, could not determine that there was

letters on the chart. Left eye covered, right eye exposed, easy and complete abduction, slow and partial adduction. At point of complete abduction the eye made slow and periodic excursions over a short area, at times the eye remained perfectly quiet. In adduction the rotation was large and rapid, the upward and downward movements were hesitatingly made. Right eye covered, left eye exposed, rotation in the whole range more irregular and spasmodic than the right; point of greatest quiet at complete adduction. Abduction could be made only to two-thirds of normal range. With this object in view, *to change the point of fixation and rest to the median line, and, possibly, by making this change arrest the spasm*, it was determined to tenotomize the external rectus of the right eye, and the internal rectus of the left. This was done, but with slight results. The rotation was less, and the point of rest was changed to 25 or 30 degrees to the right of the median line. Advancement of the right internal rectus and of the left external rectus was made, and the point of rest was carried to the left of the median line about 10 degrees. In this position the eyes were very quiet, but the habit of posing the head to the left was difficult to correct, and proved to be too great a strain upon the sutures of the left eye, for we had to introduce firmer ones on the second day. Two weeks after the first operation the eyes were as quiet in their new position as they had been in their former position of rest. Vision was good, the habit of posturing the head had been overcome, and the purpose of the operation, in part, attained.

The brother then submitted himself to the same study and treatment, with similar results. I saw the children twice during the following three months, each time there was noticeable improvement in the nystagmus. In 1890 the brother returned to the clinic, and reported favorably. Vision = $\frac{20}{xxv}$, no movement could be noticed when the eyes were in the front position, and but slight movement when making the lateral range. There was slight oscillation under the Graefe test for muscular insufficiency, and but 5 degrees of esophoria. He reported his sister quite as well as himself and having as good vision. It is needless to add that the color-blindness had not improved.

In 1894 the sister reported. The movements of the eyes were perfectly normal throughout the entire range, the vision

was $^{20}/_{xx}$. Vertical displacement gave 10 degrees of esophoria, which was corrected, as it gave double vision at times, especially when she was fatigued.

CASE 3.—Mary C. H., aged 17 years, 1889 First noticed irregular movements of the eyes in early childhood. The parents claim that the movements were slight at first, but increased as the child moved about, and that in trying to use her eyes she made violent movements; also was excited on going into strong light. At an early age they noticed that the child's head was turned to the right and bent forward; was not able to run about and play as freely as other children; in reading, held the book close to the face and moved the head in following the lines; movements of the hands accompanying close vision were slow and abnormally deliberate; complained of headache and bad spells, which I should call *petit mal*, once in four or ten weeks. These attacks had been more frequent during the past year. Just before the spells, had a buzzing sound in the ears and a flash of light before the eyes. These attacks occurred in the afternoon, and usually, following close application. Severe headaches followed the flash of light, when there was a lapse of memory and moments of forgetfulness. When the full-fledged spells occurred, she would be dull and listless for hours.

Examination: Nystagmus oscillating. Point of rest, extreme left abduction, with head forward and eyebrows elevated. Vision in right eye = $^{20}/_{LXXX}$; left eye = $^{20}/_{XL}$. Head erect and eyes directed forward, vision = $^{20}/_{60}$. The left eye could not be brought to the median line without covering the right.

Refraction: Compound hypermetropic astigmatism.

R. = + 2 D. ax. 180. V. = $^{20}/_{XL}$.

L. = + 2.50 D. $\bigcirc$ + 3 cyl. D., ax. 180. V. = $^{20}/_{XXX}$.

The estimation of the error of refraction was unusually difficult. Glasses were given with full correction, and placed so that the patient could hold the head in position of easiest vision. Headache, *petit mal*, and indigestion were at once relieved. The eye movements did not change, and the asthenopia was less.

The year following, and the eighteenth of her age, we operated, correcting the hyperphoria, and later, the posing of the head to the side. Besides the tenotomy of the left superior, an advancement of the right inferior rectus was made. Before

perfect front placement was obtained, tenotomies of the right internus and tenotomy of the left externus were made. Later, advancement of the right externus gave front placement and rest with but slight tremor in any part of the range. Vertical displacement gave but slight unsteadiness of the eyes, and alternating heterophoria. The result was better than I expected so far as the nystagmus was concerned, but the experience of the first two cases made me confident regarding the ability to change the position of rest.

CASE 4.—Thomas —, aged 11 years, 1891. Mother noticed irregular movements of the eyes shortly after birth, but the physician assured her that all children did that way. At three months of age the movements became marked, and there was evidence of low vision by the twelfth month. All efforts at close-seeing were accompanied by awkward movements of the head and violent rolling of the eyes.

Examination: Vision = $\frac{20}{60}$; head thrown back and eyes but slightly moving. Hypermetropia = 4 D. each eye; a small opacity of the position pole of each lens. Corrected error of refraction giving $\frac{20}{70}$ vision. The visual acuity was so good that I did not advise operations upon the lens. The patient is now reported as being free from nystagmus in the lateral directions, but there remains slight rotation.

CASE 5.—Charles V., aged 14, 1891. Nystagmus from infancy. Head thrown back and directed to the right; mouth open and grimacing with every movement. Point of rest, eyes directed to the left and below the median line, vision = $\frac{20}{100}$ each eye; myopia = 1 D. Nystagmus not benefited by use of glasses. Operated, advancing inferior rectus of the left eye, and corrected the lateral deviation by tenotomies and advancements upon the lateral recti muscles. The eyes were more quiet, but the patient found it difficult to overcome the habitual pose of the head.

One year later the patient reported, with head and eyes in anti-treatment position. Myopia increased to — 3 D. Under atropine remedies choroidal changes have taken place. The eyes do not seem as quiet in any position as they did before the operation. This condition is, I think, due to the lowered vision resulting from the choroidal changes, as vision only equaled $\frac{5}{60}$.

CASE 6.—Miss B. R., aged 8 years. Convergent strabis-

mus, nystagmic from birth. Vision, O. D. = $\frac{11}{60}$; O. S. = $\frac{20}{600}$. Figure 1 will give you a better impression of the child than I can by description. Head turned to the right and directed



FIG. 1.



FIG. 2.

forwards. Left eye fixing at 40° convergence and almost quiet; right eye-converging and very tremulous. Correcting glasses were given with vision = $\frac{20}{300}$ and graduated tenoto-



FIG. 3.



FIG. 4.

mies made upon both the recti muscles. The result obtained as in Figure 2. Nystagmus completely relieved.

CASE 7.—Mr. P., aged 19 years. Nystagmic from birth, had also general incoordinate movements in walking and general hand movements. Figure 3 will show the habitual pose of the head, but nothing can give an idea of the general results of a movement of either the hands or feet. Vision could not be markedly improved by glasses, but by making tenotomies and advancements, I attained the straight-ahead position (Fig. 4), with marked improvement in visual acuity and lessening of the general incoordinate movements. He was able to use the typewriter with reasonable speed, play the piano, and learn some of the steps in dancing, which were executed with ease and grace. Eccentric movements of the head and incoordinate movements of the hands and feet are among the noticeable results or accompaniments of nystagmus, and are often relieved by the correction of the muscle tremor or spasm.

The remainder of the cases I will group as follows:

ALBINOS—FOUR CASES.

CASE 8.—Mary M., aged 12 years. Oscillating nystagmus, fixation upwards and to the right. Vision = $\frac{10}{60}$. Myopia not benefited by glasses, and not advised to undergo treatment.

CASE 9.—L. K., aged 4 years. Dark glasses and advised to return for study two years later.

CASE 10.—John McC. Oscillating nystagmus, fixation and point of rest at left abduction; right eye did not follow; left, vision = $\frac{20}{100}$, improved by a + 1.50 cyl., ax. 90, vision = $\frac{20}{100}$. Operated, to secure central fixation, with good results so far as the left eye was concerned, but the right eye soon relapsed into its old independent position, and was not again interfered with. The glasses given in this case were made of two layers of glass, one clear and correcting the astigmatism, and covered with a perforated disk of dark "London smoke" glass, which acted as a diaphragm excluding the side light. This device allowed prolonged work in a strong light; the patient was a draughtsman.

AMBLYOPIA DUE TO UNDEVELOPED OR DISEASED RETINAS, OPTIC NERVES, OR CENTRAL DISTURBANCE OF THE VISUAL FUNCTION.

First Group.—Six cases where one eye had vision which was, or could be raised to, or above $\frac{20}{100}$.

CASE 11.—Oscillating nystagmus, both eyes converged; contraction of internal check-ligament. O. D., vision = $\frac{20}{\text{cxx}}$. With correcting glasses vision = $\frac{20}{\text{xl}}$. O. D., vision = $\frac{20}{\text{cc}}$, not improved by glasses. Limited abduction of both eyes, violent nystagmic movements attended all movements out of point of rest. Operations: Retraction of orbital fascia, guarded tenotomies of internal recti. Result: Good cosmetic effect and rest at front fixation.

CASE 12.—Oscillating nystagmus. Right eye fixing. V. = $\frac{20}{\text{oxxx}}$; rest point in front position. Correcting glasses gave vision = $\frac{20}{\text{lx}}$. Left, perception of light only, wandered about independent of its fellow. With the correcting glasses + 2.50 D. first, and later an added correction of + 50 cyl. ax. 90, the eye became quiet, and only the slightest tremor could be noticed at any point of the field of rotation.

CASE 13.—Oscillating nystagmus, not benefited by glasses. Vision = $\frac{20}{\text{o}}$ in the left eye, $\frac{20}{\text{cc}}$ in the right. Left eye converged and was used in right field of vision; right eye converged and was used in the left field of vision; but slight movements at points of greatest rest. Operated both eyes and obtained good front position of rest, but could not secure coincident binocular vision. This case relapsed so far as the right eye was concerned, and we gave up further treatment.

CASE 14.—Mixed nystagmus. Left eye undeveloped, lid aperture small, lid movements slow and not corresponding to the right; no point of rest. Vision = perception of light and the passage of shadows. Right eye and side of face normal in development; vision = $\frac{20}{\text{Lxxx}}$ with + 2.50, ax. 90 = $\frac{20}{\text{xl}}$ at point of rest, which was to the nasal side and above the median line. As the patient closed the left eye most of the time, and preferred not to have it disturbed; the right eye was operated by retracting the ocular fascia and advancing the externus. This secured good front position with almost complete rest of the eye in all proximal acts of seeing.

CASE 15.—Male, aged 28 years. Rotating and vertical oscillating nystagmus. Left eye amblyopic. Right eye, V. = $\frac{20}{\text{oxx}}$ with head forward and slightly to the left. The mouth was always open, and the alæ of the nose dilated when looking intently at any object. Vision = (— 2. D.) $\frac{20}{\text{xxx}}$ in position of rest. The rotating movement disappeared after using the glasses for a week, and the eyes were quite steady in the rest

position. A tenotomy of the superior rectus of the right eye placed it in the normal position, and all movement ceased. The left eye remained recumbent across the palpebral aperture and could only be directed forward by forced abduction with fixation forceps. The exposed conjunctiva was a beefy-red. There was an extensive posterior staphyloma with apparent thinning of the scleral walls. For cosmetic effect and to remove an offending member I advised enucleation. I have tried, but failed to secure a photograph of this patient, for the change secured is better seen than described.

CASE 16.—Right eye fixed and immobile; lids partially closed; right side of face expressionless and slightly brawny; left eye oscillating and jerky. Vision at times = $^{20}/_{XL}$, at others when the spasm was more irregular, $^{20}/_{CC}$. A form of irregular spasm of all the face muscles. The position of rest was not located. Refraction of right eye = 4. D. $^{20}/_{XL}$ under atropia, but glasses were not worn. Did not attempt operative interference, for I was confident that the case was of central origin.

AMBLYOPIA AFFECTING BOTH EYES, BRINGING THE CORRECTED VISION BELOW $^{20}/_{CC}$; THREE CASES.

CASE 17.—Patient, aged 9 years. Mixed, irregular nystagmus; corneal opacity and irregularity from birth; eyes painfully sensitive to light; lids small and tightly drawn over the diminutive globes. Vision could not be improved. There was no uniformity of movement, and the eyes were, at times, directed upwards for a moment before attempting to fix the object to be seen.

CASE 18.—Patient, aged 7 years. Eyes apparently normal in every way with the exception of rotary nystagmus. Vision = $^4/_{CC}$. In strong light pupil normal in reaction, could not see to read; no point of rest. Vision could not be improved. No attempt was made to correct the error.

CASE 19.—Patient, aged 11 years. Rotary and irregular oscillating nystagmus; vision could not be raised above $^4/_{CC}$; irregular corneal astigmatism; no history of inflammatory disease; corneal transparent. Point of rest was located in the right upper field, but the rotation at this point was not materially less.

The conclusions to be drawn from the study of these cases reported, may, I think, be stated as follows:

1. Congenital nystagmus may be due to amblyopia from any cause, or from ametropia.

2. Congenital nystagmus may occur in atypic development of the eye and its appendages, and be due wholly or in part to the exhaustion or irritation of the motor oculi muscles or their nervous centers in their attempt to coordinate with the other acts of vision.

3. In treating cases due to amblyopia from errors of refraction, the correction of the errors may lessen or completely cure the spasm.

4. Those cases which are due to amblyopia from other causes than errors of refraction may be relieved directly as the cause of the amblyopia can be removed.

5. The causes which are due to atypic development of the eyes or their appendages may be relieved so far as we are able to properly establish them in normal relation to each other and their surroundings.

The remedies of science in my hands have been, first, carefully correcting errors of refraction and the placing of the correcting glasses in the best position to secure the best vision; second, training the eyes to perform their ranges of rotation with the head fixed; third, operations upon the recti muscles to secure full abduction, adduction and central fixation with eyes at point of greatest rest.

DISCUSSION.

DR. TIFFANY.—This is a subject which we are as much interested in as any. In most of the cases I have had it was due to congenital cataract, anterior or posterior polar cataract. When no such affection is present, it must be due to some heterophoria, some insufficiency of the extrinsic muscles of the eye and as the Doctor said, the treatment should be directed to the correction of that. I think, however, that it may be done with gymnastic exercises, with prisms and without surgical interference. In the case of albinos, of course, there is nothing to be done unless by use of the stenopæic disc. I have found that in rotary nystagmus the trouble usually is in the oblique muscles, whereas the horizontal form is due to esophoria or exophoria and the vertical is due to hyperphoria or kataphoria.

DR. FRYER.—I want to ask the Doctor whether he has

found in any of his cases a double fixation as the cause of the nystagmus. The most frequent cause of this condition, I believe, is not originally the muscular trouble, but some condition of amblyopia, and in the effort to fix the object the spasm of the muscles is brought about as a secondary matter. I should also like to ask the Doctor if he has been able, from his studies, to state which cases are operable and which are not.

DR. COLBURN.—So far as the double fixation is concerned, I have noticed that many times, and when the vision was equal in both, the use of the right eye in the left field and of the left eye in the right field. I think the trouble lies very largely in the capsule, tendon and check-ligament. The amblyopia is undoubtedly a great cause, and in so far as that can be relieved we can hope to benefit the cases. Most of the cases are due to structural changes of the fascia. In the albinos the condition is due to lack of pigmentation, etc. We can often get great benefit from the use of stenopæic glasses, and I have used a little disc for correcting the refractive error putting it upon the glass or set in a very dark smoked glass. Sometimes among my poorer patients I have shown them how to Japan their glasses. This is exceedingly useful in appropriate cases.

OPHTHALMIA NODOSA.¹

BY GEORGE KNAPP, M.D., VINCENNES, IND.

PROFESSIONAL and natural pride kindles at the thought that, in the near future, the science of human life will present a highway of certainties such as now welcome the earnest and competent student in the study of the largest of the natural sciences.

I am not unmindful of the barriers which sacrifice, labor and skill must surmount before there can be a full realization of such a condition, the complexity of the subject matter, inviting as it does, constant investigation—rewarding the zeal-

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

light on pathways and in caverns heretofore enveloped in doubt and darkness., but the kiss of the friendly light, which bestows upon the searcher an intelligent understanding of his surroundings, reveals the existence of other recesses and mysteries, *unexplored*.

The living human body is, in both its natural and indwelling forces, the most complicated mechanism to be found within the realm of knowledge, and, this most complex of all things, is presented to us, in our practical duties, in an almost infinite multiformity. In practice, we are occupied, not with a type and pattern of human nature, but with all its varieties in all classes of men, of every age and every occupation, in all climates and in all social states; we have to study men singly and in numbers, in poverty and wealth, in wise and unwise living, in health and all the varieties of disease; and we have to learn, or at least try to learn, the results of all these conditions of life, while in successive generations and in the mingling of families, they are heaped together. In every one of all these conditions man, in habit, mind and body must be studied by us; and every one offers some different problem for inquiry and solution.

Wherever our duty, or our scientific curiosity, or, in happy combinations, both may lead us, there the material and there the opportunities for separate original research will be found.

Each and every one of us, who fully appreciates the importance and the magnitude of his work, encountering as he must, new difficulties at every turn, feels that he is an explorer in the forests and on the great plains of human life, seeking additional help for the rescue of pain-stricken humanity. Armed with the experience and wisdom of the past, he strives with might and main to add to the treasures, bear them onward to the last step which ends at his grave and cast them with loving hope into the glowing bosom of the future. So we meet here and now as explorers in the boundless domain of knowledge, to reason together, to compare notes of the regions through which our weary feet have passed, to frankly admit our mistakes, to acquaint each other with our professional triumphs, and to aid each other in the construction of safeguards and the strengthening of the weakened ramparts of life and comfort, against the fatal assaults of injury and disease.

I am expected to say something upon the subject of *Ophthalmia Nodosa*.

I can not promise you that my offering will prove either entertaining or serviceable to you, or to the profession at large; and, perhaps, the only value which may attach to my utterances, will be the spirit of candid sincerity in which they are expressed.

You may know quite as well, and perhaps, far better than myself, how very meagre the literature of our profession upon this subject is, and I do not even pretend familiarity with what has been written.

In my clinical and hospital work, both in this country and in Europe, not a single case came under my observation, but in my practice within the past year, I am convinced that three patients were the victims of this malady, and for those who may be interested in hearing a brief recital of them I will now proceed to state each case, so far as I am able to do, together with the actual results obtained:

June 26, 1896, Irwin C., aged 22 years, and a farmer by occupation, presented himself at my office for treatment of the left eye. He informed me that some days prior to that time, while climbing a cherry tree, a falling body, which he believed to have been a caterpillar, struck him in the eye, and that almost immediately following the reception of the stroke an intense itching, burning and smarting ensued, and which was closely followed by great swelling. He further stated that the only cessation of the sufferings which he experienced was during the application of very cold water.

Owing to intense photophobia I was compelled to cocaine the eye before the lids could be separated sufficiently to admit of an examination. When this had been accomplished, I found both palpebral and ocular conjunctiva greatly inflamed, with marked ecchymosis and a hazy cornea. I made the usual examination for foreign bodies in the cornea and finding none, decided that it was a traumatic, infectious disease and treated it accordingly.

On July 2, all pain having subsided, I made another examination and found the conjunctiva almost normal, with slight extravasation at sclero-corneal margin, nasal side; vision, $\frac{20}{XL}$. Right eye, $\frac{20}{XL}$ with $+ .75$ cyl. ax. $60^\circ = \frac{20}{XX}$. Glasses did not improve the vision of the affected eye.

After an absence of three months, he returned for treatment. During that period, according to his statement, the eye had suffered greatly from repeated attacks of acute inflammation, all of which had partially yielded to antiphlogistic treatment except the last attack which had kept him in a state of torture bordering on frenzy.

I again made an examination and found photophobia with profuse lachrymation, a diffuse infiltration of the cornea and the lower half vascular. The iris discolored with multiple posterior synechiæ, adherent to the lens capsule. Near the center of the temporal ciliary border of the iris I discovered a prominent nodule of a gray, or reddish gray color. Behind the iris on the temporal side, was discernible an iridocyclitic exudate, slightly vascular, and three dark, gray nodules in the episcleral tissue, unmovable. Tension — 1. Vision, fingers at 5 feet.

September 27, I extirpated the episcleral nodules, hardened them in Miller's fluid, stained by Gabbet's method, and the microscope revealed quite a number of giant, round and epithelial cells and also the horizontal section of a hair; cortical layers a dark-yellow and a light medullary substance,—the margins denticulated similar to that of a caterpillar hair.

October 6, I removed that portion of the iris which contained the nodule which, for want of time, was not subjected to microscopic examination. Treatment: atropine, unguentum cinereum.

The last time I saw the patient, which was on the 28th of the following month, the general condition of the eye was much improved. Vision $\frac{6}{xxxvi}$.

CASE 2.—September 20, 1896, James B. presented himself for examination and treatment of the right eye. He informed me that two weeks prior to that time the eye became inflamed, with slight pain, but accompanied by an itching and burning sensation in the member which was sensitive to light.

On examination I found the cornea, iris and vision normal. The palpebral conjunctiva and transition folds presented a vivid, red, smooth surface with the conjunctiva bulbi slightly injected. The subjective symptoms were itching, burning, photophobia and copious lachrymation.

The examination and history of the case induced the belief on my part, that the inflammation was catarrhal in its

character and the remedy employed was one-half per cent. solution of nitrate of silver.

On October 4, the patient returned and stated that the eye was much improved. Examination revealed the fact that the left eye was in no manner affected. The vision of the right eye was $\frac{6}{VI}$, with slightly increased lachrymation and photophobia; the palpebral conjunctiva was much improved, while the injection in the ocular conjunctiva was more pronounced, with three small excrescences.

In the light of these symptoms my diagnosis underwent a most radical change. Treating it as a case of ophthalmia nodosa, I extirpated the nodules and on examination found in two of them, hair fragments. In the treatment I employed atropine, cold compresses and a solution of boracic acid and the trouble readily yielded.

My opinion at this time is, that if on examination of the conjunctiva, I had brought into requisition lateral illumination and loupe, I would have discovered and extracted the hairs and as a consequence, would have conquered the ailment at the start.

CASE 3.—September 27, 1896, Miss B. came to my office for treatment of an eye. She stated that a couple of days before her sister threw a caterpillar which struck her in the eye. Burning, itching and pain followed. Observing that the eye was very sensitive to light I used a four per cent solution of cocaine four times within a space of twenty minutes.

On examination I found the eye highly inflamed and the cornea slightly injected. Aided by lateral illumination, I made careful search for foreign bodies, but found none. I then applied three leeches and instilled atropine. Two days later, by the use of lateral illumination and the loupe, I discovered two caterpillar hairs in the cornea and four in the ocular conjunctiva, which I scraped out with a foreign-body needle. This operation was followed by considerable reaction and increased lachrymation, which lasted about forty-eight hours and during which time I used "Kalt's douche" twice a day. On October 22, the eye was free from inflammation and the vision $\frac{20}{XX}$.

My humble opinion is, that in all cases where the history is vague and uncertain, but where the symptoms and indications suggest to the mind of the practitioner, ophthalmia

nodosa, that resort should be had to the microscope, as that alone can enable one to make a positive diagnosis.

It was acutely said by Montaigne, I believe, at one time, that it was the good fortune of physicians that the sun illuminated their successes and the grave covered their faults. But this is no longer true. The sun of investigation and research develops our blunders now in the full glare of day and the grave is made to yield up its every secret, while the advance guard in our own profession holds our errors up to the public gaze and mercilessly flails the lagging and indolent member who ignorantly and carelessly brings injury to any member of that sublimely intricate mechanism called the human body.

DISCUSSION.

DR. COLBURN.—During the last year one of the gentlemen of our Society reported a case similar to this and it was the first case I had ever seen,—at least the first I ever recognized. Last year a case occurred in the child of one of my neighbors, and in that case we were able to demonstrate the hair on the conjunctiva before it had penetrated very deeply, so it was removed; but one was penetrating the cornea and lay partially in the anterior chamber. This caused the most serious and provoking irritation that I have ever seen in the eye, and it was only relieved by passing the keratome through the cornea and removing the hair. I never saw a patient suffer such intense pain from a corneal irritation for four or five hours than this little girl did. One or two of my confrères were called in to see the case.

CAN CASTRATION AND OVARIOTOMY CAUSE OPTIC ATROPHY? REPORT OF TWO CASES.

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU; C. & M. V.; B. Z. & C. RYS.; CITY HOSPITAL, ETC.

CASE 1.—Miss L. G., aged 41, wash-woman. A year ago had both ovaries removed for ovarian tumor by Dr. J. G. F. Holston, of this city. Tumors had been growing for six years. Says that immediately after the operation she became

quite deaf in both ears, also has noticed trouble with vision ever since. Says she never had any deafness or defect in vision. R. E., retinoscopy shows + .75 D. sp. $\ominus$ — .25 cy. 180. L. E., + 1.25 sp. $\ominus$ — .5 cy. 15. V., types, R. E., glass found = $\frac{1}{x}$; L. E. = $\frac{1}{x}$. V. = $\frac{1}{x}$. Ophthalmoscopic examination, R. E., papilla hazy on inner half and very pale throughout and slight cupping. Retina very pale. Veins enlarged and tortuous. L. E., same condition as right but disc much paler. Visual fields not examined. Hearing: Grubers and Rinné's tests show both auditory nerves affected. Tests also show catarrhal deafness of both ears. It is hard to determine whether deafness is only partially the result of catarrh, or whether is due partially to primary disease of auditory nerve. Patellar reflexes normal, no disease of brain or spinal chord, rheumatism or kidney disease. No glaucoma. Disease of both auditory and optic nerves may have been in existence before ovariectomy was done. The great flow of blood to the ovarian tumors may have drained the blood from the auditory and optic nerves, so as to have impaired their nutrition and caused atrophy. We know that ovarian tumors may cause melancholia through malnutrition of brain. So also do we know that menorrhagia, post-partum hæmorrhage, etc., may cause optic atrophy.¹ So also do we know that reflex disturbance by causing either hyperæmia or anæmia of optic nerves or visual centers may produce disease of optic nerves.²

Now, if her statements are correct (that is, that she was not blind or deaf before operation), then we may safely conclude that the removal of the ovaries produced some reflex disturbance—either anæmia or hyperæmia—which resulted in disease of both auditory and optic nerves.

CASE 2.—This case is a young colt, 8 months old, which was castrated several weeks since. Its vision before this has been perfect, to all appearances. About ten days after castration it became totally blind. Upon request of its owner I made an ophthalmoscopic examination and found pupils widely dilated and feebly responsive to light. Both eye-grounds showed both arteries and veins very fine and thread-like. Discs very

¹Bowman Lecture, Oph. Rev., Vol. VI.

²Ibid.

pale and cupped. The veterinary in charge says that otherwise the colt is perfectly sound.

I conclude that castration has produced same reflex disturbance which has caused total optic atrophy of both eyes. I recommended the glonoin and strychnine treatment.

REMARKS.—I have searched considerable literature and find no similar case.

Power³ says: "The precise mode in which menstrual function operates in inducing ophthalmic disease is obscure. It may be by retaining in the blood, in cases of sudden suppression of the menses, and in cases of amenorrhœa more slowly induced, materials that are of a poisonous nature, the action of which is indicated by the loss of blood making power, and consequent imperfect performance of other functions, with spasms and pain in different regions of the body, in which the eye participates; or, it may be by acting on the blood-vessels of the eye alone through the nervous system in a reflex manner, and thus interfering with its due nutrition, as we know may occur in cases of dental disease and the intestinal irritation of worms."

Masturbation, sexual excesses, uterine diseases are other reflex neuroses that affect the optic nerves. The question as to whether castration and ovariectomy can cause blindness or deafness is a new and very interesting one.

The proposition now before the public and which the Kansas Legislature is now debating—as to the castration of criminals may be an excellent one and should it be adopted we will have an opportunity to study the effects of castration on the eyes. It is to be hoped that some enterprising ophthalmologist may collect statistics on the effects of ovariectomy on the eyes, if any.

³Bowman Lecture, Oph. Rev., Vol. VI, page 367.

CLINICAL MEMORANDA.

A CASE OF COMPLETE URÆMIC AMAUROSIS.

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ON MAY 1, I was called by Dr. S., to see Mrs. F., who was suffering with uræmic convulsions. I found her pregnant, as she supposed eight and a half months; totally blind, with urine almost solid with albumen. She had been suffering for several days with severe headache. In the afternoon of May 1, about 4 o'clock, she complained of dimness of vision; about 8 o'clock she had convulsions, and by the time she was quieted she could see nothing.

On examining the eyes, I found the pupils reacting freely to light. After the use of a 4 per cent. solution of cocaine I examined, with the ophthalmoscope, finding the following conditions: Marked œdema of both discs, with passive congestion of the whole retina; the veins very large, numerous and tortuous; the fundi had a smoky appearance throughout their entire extent.

There was such complete blindness that the patient could not see a light held within eight inches of eyes. Patient was delivered with forceps, and remedies were used to relieve the uræmic poisoning. She remained perfectly blind until about 9 o'clock P.M., of May 2, when she could point out the direction of a bright light held near. At this hour the amount of albumen in the urine was reduced about one-third. On May 3, at 9 o'clock A.M., she could see well enough to distinguish her husband. Ophthalmoscopic examination at this time showed a diminution of all symptoms. Three days later, when there was scarcely any trace of albumen in the urine, she could read No. 1 J. with but little difficulty.

The interesting point in this case is the complete absence of typical albuminuric or hæmorrhagic lesions of the fundi associated with perfect blindness of thirty hours' duration followed by complete recovery in so short a time. The cause of such complete amaurosis can not be due to the retinal changes.

Often we see fundi which show marked lesions and still retain good vision. We cannot refer it to any disease of the optic nerve. If this had been so severely affected optic atrophy would have followed. No such rapid recovery could have been possible with lesions of the nerve or retina of so severe a type as to cause complete blindness of thirty hours. I think that the condition was caused by temporary poisoning of the cortical centers of vision by the excess of urea in the blood. In support of this supposition I refer to the immediate return of sight as soon as the albumen began to disappear.

The prognosis in all complete amauroses should be guarded. To tell the patient that they shall never see again certainly would be depressing, but to tell one they would not, and in five days they could read, would be rather depressing to the physician, and the patient would doubt whether his opinion was worth paying for.

In making a prognosis, we must look well to the cause of the amaurosis. If this be within our control, we may give a favorable prognosis; provided there be no lesions sufficiently serious to protract the blindness, and also provided the pupils act freely to light. If the pupils fail to react to moderately strong light, I certainly would give a guarded or unfavorable prognosis.

BOOKS AND PAMPHLETS.

EYE-STRAIN IN HEALTH AND DISEASE. By A. L. RANNEY, A.M., M.D. Thirty Wood Engravings. The F. A. Davis Company, Philadelphia. 1897.

In this book Dr. Ranney, the well-known supporter of Stevens' theory: that eye-strain causes innumerable and varied nervous affections, has collected his articles and reports which from time to time have previously appeared in different medical journals. It is interesting reading even for those whose results and experiences have never, or only once in a while, reached the high order, which almost invariably seems to have been the doctor's good fate.

The publishers' work is well done.

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THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

SEPTEMBER, 1897.

NO. 9.

ORIGINAL ARTICLES.

HYSTERIA IN OPHTHALMOLOGY.¹

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HYSTERIA, as commonly known, embraces a multiplicity of morbid phenomena, and is used as a name to denote disease or a train of symptoms depending upon an abnormal condition of the nervous system and of the mind and entering largely as a morbid element into a variety of affections.

A hysterical condition, as regards the mind, involves a morbid susceptibility to emotions and a defective power of will to restrain their manifestations.

A tendency to exaggerate subjective symptoms of disease often enters with the hysterical condition, proceeding sometimes, from an exaggerated sense of existing symptoms, often from a morbid desire to excite interest or sympathy.

It is an important part of the knowledge and tact of the practitioner to make due allowance for this tendency, in his investigation of symptoms, as in many cases a morbid perversion of the mind leads patients to practice gross frauds as regards

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

their ailments. They pretend to have extraordinary disorders, and resort to ingenious and persevering efforts of deception. Here, too, the knowledge and tact of the physician is called into requisition to discriminate between the real and the false or imaginary ailment, for upon the true determination, as to the extent hysteria enters as a factor, must depend the line of treatment.

Yet in this connection we must not lose sight of the fact that hysterical self-deception may be present in some patients who are in no wise to be classed as malingerers, as they have no deliberate purpose in deceiving.

Osler, in his "Principles and Practice of Medicine," page 967, states: "Of predisposing causes of hysteria, two are important, heredity and education. The former acts by endowing the child with a mobile, abnormally sensitive nervous organization. We see cases most frequently in families with marked neuropathic tendencies, the members of which have suffered from neuroses of various sorts. Education at home too often fails to inoculate habits of self-control. A child grows to girlhood with an entirely erroneous idea of her relation to others, accustomed to having every whim gratified, and abundant sympathy lavished on every woe, however trifling. She reaches womanhood with a moral organization unfitted to withstand the cares and worries of every-day life. At school, between the ages of twelve and fifteen, the most important period of her life, when the vital energies are absorbed in the rapid development of the body, she is often cramming for examinations and cooped up in close school-rooms for six or eight hours daily. The result is too frequently an active, bright mind in an enfeebled body, ill-adapted to subserve the functions for which it was framed, especially disordered, and prone to react abnormally to the ordinary stimuli of life." The nervous and mental disorders which constitute what is commonly known as hysteria or the hysterical condition may be associated to a greater or lesser degree in a host of affections; our purpose, however, is to consider this condition and its manifestations in the many remarkable functional disturbances caused therefrom, from the standpoint of the ophthalmologist.

In my opinion this subject has not been given enough prominence in the ophthalmic literature. A few writers dismiss

the subject with a brief mention of the fact that certain eye affections may be associated with hysteria; again, we find a paragraph devoted merely to naming conditions of the eyes that may be dependent upon the hysterical condition.

Noyes, in his "Diseases of the Eye," says: "Hysterical amblyopia, or as it is sometimes called, retinal anæsthesia, is a recognized condition, and has been studied by Charcot, Landolt and others. It is temporary, irregular, and attended by other hysterical symptoms. Hemi-anæsthesia is sometimes a characteristic of the cases."

There may be only one eye affected, and but one-half of the field. There may be only central scotomy. A case of hysterical blindness, or perhaps rather simulation, lasting ten years, is reported by Harlan, "Trans. Amer. Oph. Soc." 1889: "Hysterical hyperæsthesia retinæ, no visible disease of the tissues which may cause photophobia, no morbid disease of the fundus found, very frequently brought on by a preceding illness, an uncorrected error of asthenopic condition due to muscular insufficiency. Another affection, known as asthenopia retinæ, due to a general nervousness; the patients are usually anæmic, neurasthenic, or hysterical. In these cases complaint is made of deficient endurance in working, with darkening and swimming of objects looked at. After excluding errors of refraction and accommodation, insufficiency of the muscles, and disease of the fundus, we can generally assume only nervous causes."

De Schweinitz, in his work, page 484, states: "Hysterical blindness usually occurs in young girls and women; but both males and females may be affected. The loss of vision is complete, almost always mono-lateral, the pupils act promptly to light when the sound eye is covered. The ophthalmoscopic appearance is normal. Quite commonly it is possible to prove by the usual tests that the supposed blind eye sees. In addition to monocular blindness there is a large group of cases in which achromatopsia or dyschromatopsia, contraction of the field of vision, and hemi-anæsthesia constitute the symptoms. Sometimes, instead of simple contraction of the field of vision, there is a hemianopsia." * * * "Partial or complete color-blindness sometimes occurs and often with a more or less reversal of the colors as they normally appear."

Schmidt-Rimpler mentions retinal anæsthesia (amblyopia

of the visual field) as particularly prone to be hysterical in character, and adds: "There comes a peculiar, usually bilateral, and quite rapidly developing form of moderate impairment of vision. It is attended with decided concentric narrowing of the visual field and with disturbance of the light and color-sense, vision usually better in twilight than in bright illumination. In unilateral blindness in hysterical patients it is a question whether we have not to deal with a psychical suppression of the visual impressions."

I think there is no longer a doubt in the minds of the majority of ophthalmologists and neurologists that long-continued eye-strain may cause hysterical manifestations as demonstrated by Stevens in his work on "Functional Nervous Diseases." He not only solved the problem as to the cause of those obscure cases that were indiscriminately classed under the general head of asthenopia, but gave us a radical treatment therefore. So commonly is the lack of muscle balance the cause of the hysterical condition, that I presume there is not one among you who has not met with one or more cases. In these conditions we have to combat, not purely an imaginary or nervous condition, *per se*, but a functional disturbance produced by a weakend muscle or set of muscles attempting to perform their function, meanwhile expending a greater amount of vital energy and nervous force than is normally demanded to accomplish this purpose; this continues until there is a general nervous disturbance, with the varied train of symptoms, which usually accompany these conditions. Another class of cases with the nervous phenomena very marked and where we find absolutely no morbid condition present to account for the symptoms, are those in which there is intense intolerance of light, not allowing even a ray of light in the room where they are confined. I recall a case in a young lady, whom I had previously treated for hysterical aphonia; she had not spoken or whispered for several weeks. One day, while riding upon a street-car enroute to the office, a run-a-way horse collided with the car and so frightened my patient that she gave vent to a shriek and began talking; there was no relapse into the former condition. She was brought to the office, her eyes covered with layer after layer of dark cloth bandages, which she would not allow me to remove until the room was thoroughly darkened. She complained only of her inability to open her eyes

where it was light and cried with pain when the closed eyes were exposed in a dimly lighted room; there was no pain when the eyes were bandaged. Careful inquiry into the history of the case furnished no clew for the existing condition. In talking with her father I learned that the present condition had persisted for three days and that the attack had followed closely the father's instructions to her, to cease going with a young gentleman of whom she was apparently very fond. Having in mind her previous attack of aphonia, I concluded that this attack was of the same nature. I informed her it was necessary to chloroform her to operate upon her eyes. She was promptly anæsthetized and I proceeded to make a careful inspection of the eyes and appendages and found absolutely nothing present to account for the photophobia.

She was allowed to come out of the anæsthesia in a well-lighted room without a bandage on the eyes. As she was slowly awakening I assured her she would see and that the light would not hurt her eyes, also that she would be well within a week. She was then taken home in a carriage; the result was all that could be desired.

CASE 2.—A young lady, aged 17 years, apparently in perfect health, was brought to me by her mother on account of a slight deafness, which I found to be caused by impacted cerumen. During the examination of the ears she was very nervous, fearing that she would be hurt. While trying to reassure her that she would not be hurt, I noticed one of the eyes converging to a marked degree. I placed my hand over the eye and found, apparently, alternating squint. Inquiring of her mother why she did not attend to her eyes, she answered, "she has no trouble with her eyes." I explained to her the possibility of some error of refraction being present, and after removing the cerumen from the ears, proceeded to examine the eyes. I found in each eye $20/xx$. The ophthalmometer did not show any corneal astigmatism, there was no manifest error in either eye. I then ordered atropine gr. ij to $\text{℥} j$, two drops instilled four times daily. In three days she returned, and to my astonishment there was no squint and her vision was $20/xxv$ + and with + .25 D. V. was $20/xx$ +. Fourteen days later she presented herself and I found absolutely no convergence and only $1/4^\circ$ of hyperphoria. Several examinations of the muscles

were made with the same result. Nothing further was done for her eyes.

Her mother recently informed me that she had noticed the eyes crossing occasionally when she was much excited but they did not remain crossed. I recorded the case as one of hysterical transitory alternating squint.

Through the kindness of Dr. J. Elliott Colburn I append the report of two cases that were undoubtedly of a hysterical nature.

The first case was of hysterical deafness, amblyopia and color-blindness occurring in a Swedish woman, unmarried, and with no other disease apparent. She was 28 years of age, rather slight, and a blonde; rather of the stoical temperament. She complained for some time of lowered vision in the left eye, with disturbed vision in the right, she also was deaf in left ear. Tests of her hearing convinced me that the deafness in the left ear was emotional, and further investigation showed that there was no change in the appearance of the drum, and no response to the tuning-fork when held at proper distance from the ear, or when the handle was held upon the sides of the head. Testing each eye separately we found that she was totally blind in the left eye, and blind to red in the right. I called Dr. P.'s attention to the case, and he hypnotized her. Upon suggestion, she was enabled to read ordinary print with either eye, and was able to distinguish the colored worsteds and colored disks without difficulty. Upon making suggestion the power of hearing was also brought up to normal. This condition would last for several hours after the treatment. She remained in the hospital a short time, and finally disappeared. I do not know the ultimate result as far as the treatment was concerned.

The other case was a Miss R. who had been subject to headaches for some time. She had consulted an oculist and had glasses supplied, but as there was some spasm of accommodation, she did not wear them with comfort. About this time she was behind with her work at school, and was endeavoring to make up by added hours of study. She had some photophobia, and for a few days was obliged to stay in the dark room. When she came out the intolerance of light was great, and she complained that she could not open her eyes without her glasses (weak sphero-cylinders). I found that

there was slight oscillating nystagmus upwards and downwards. I was convinced that we had a case of hysterical photophobia, and demonstrated the fact by placing a pair of plain glasses in front of her eyes, with the assurance that they would give her all the relief that her own glasses gave, which was a fact. Immediately upon their removal, the eyes turned upwards, working spasmodically, and no persuasion could induce her to bring them into the normal condition. I then pressed firmly upon the nose at the inner canthus, and bade the girl to sleep; after some little time she obeyed, and upon suggestion, opened her eyes and read small type without difficulty. I then instilled into each eye two drops of a 1 gr. to the ounce solution of eserine assuring her that she would have no return of the trouble, and would be able to wear her glasses without difficulty. In a few days I was able to make a careful study of her refraction and of the muscle balance and found that she had three degrees of left hyperphoria; this I corrected by tenotomies. The correction given for the error of refraction was continued.

A recent letter from her informs me that she has had no return of the spasms or photophobia, and is able to use her eyes comfortably.

I have no doubt that the hyperphoria, together with her impaired health, had much to do with the hysterical manifestations.

In the treatment of cases of hysteria which may come into the hands of the ophthalmologist, as in the cases of the neurologist, the tact and judgment of the physician must be brought into play. Ranney, in his "Lectures on Nervous Diseases," says: "It is very essential in the first place that the doctor has the respect and full confidence of the patient. The impression made upon the mind of the patient by the personal characteristics of her medical attendant has often a great deal to do with the efficacy of the steps employed for the relief of the symptoms. Possibly this accounts for the fact that recoveries have occurred under lines of treatment which could have had little, if anything, to do with the benefits derived. We are all apt to think that any given patient recovers in consequence of some medicinal agent that we may have administered, when perhaps the mind of the patient has simply been forcibly influenced. In the second place we must make such subjects believe that their symptoms are perfectly understood, that all

points of the case have been thoroughly noted and examined, and that there is strong reason to hope for complete recovery. Ridicule, or the implication that the symptoms are purely imaginary, is apt to destroy the physician's influence over the patient, etc."

Approving the above as very essential in the successful treatment of these nervous patients, I would go further, having very great confidence in the mind treatment. I would therefore, in cases where we are satisfied, after careful examination, that we have simply some functional derangement due to a hysterical condition, formulate a plan of treatment having as the main factor, mind-impression, or suggestion; if unable to control the mind sufficiently to hope for a successful result without it, hypnotism may be resorted to. The physician must establish perfect confidence in the patient, otherwise his assurance or suggestions would be fraught with little, if any, good; additional attention must be given to the patient's hygienic surroundings, some medication in the way of a nervine or nerve tonic may be of service. It is always well to impress upon their minds that it is important that they carry out carefully the directions regarding the use of the medicine, whether it be a collyrium or internal medication. Frequently we have patients presenting themselves in a highly nervous condition, complaining of a varied train of eye symptoms all of which disappear in curing a slight miliary or papillary ophthalmia. It has been proven satisfactorily, I think, to a notably large number of eminent neurologists that eye-strain enters largely as a factor, in exciting the recurring attacks in hysteria and epilepsy. That epilepsy can be relieved or cured, in many cases, by correcting the refractive errors and all muscular insufficiencies that may exist should be no longer doubted. After several years of painstaking investigation Dr. A. L. Ranney has given us reports of a great number of epileptics either much benefited or cured by graduated tenotomies, and he goes so far as to recommend the examination of the eyes of all hysterical patients, and cites numerous cases which have been cured by graduated tenotomies. He is, indeed, a skeptic, who does not accept the reports of so eminent a neurologist, as scientific truths, in spite of the quibblings of certain eminent (?) specialists who question the results of this treatment in the class of cases mentioned. If one does not wish to employ

hypnotism, or is unable to get the mind of the patient under his control, an anæsthetic may be resorted to. It should be administered until there is profound narcosis, meanwhile, reassuring suggestions should be given the patients both in going under and coming out of the anæsthesia, keeping prominently before them the fact that they will be well after they sleep; in this way we may obtain control of the mind of the hysterical subject and overcome, for a time at least, the distressing conditions which have previously existed. In cases where we resort to hypnosis in order to secure good results it must be profound, and the patient thoroughly under the will of the operator.

Dr. Frank S. Milbury, in the *New York Medical Record* of March 20, under the head of "Hysterical Amblyopia," cites three cases, one of which was blind for seven years. Hypnotism had been tried without benefit; she was completely cured by mind impression. I quote from the author's article as follows: "Something, I do not know what, induced me to look in her mouth; but there I found a badly broken-down second superior left bicuspid. Intentionally, I enthusiastically exclaimed that I had found the cause of all her trouble. She doubtfully asked me, 'What?' and I told her that the disease of the tooth was in such a way connected with the eye as to produce pressure and thus cause blindness, and if removed it would end her infirmity. As will be presumed her faith was weak indeed, and it took many days and much talk to convince her that I was right. However, eventually she was convinced, and wanted it out at once; but I delayed several days for the purpose of having the fact fully impressed on her mind. I had explained my scheme to her father and he also built a big castle in the air in fear and trembling. At last it was concluded to extract the offending tooth. She wanted gas, but I told her that in a measure that would destroy the effect, as the more it hurt her the better she would see. So out it came, and complete restoration of vision followed, and remained normal to the time of her death from typhoid fever, over two years later."

The other two cases mentioned in the article were in children, both of whom were completely restored by suggestions while in the hypnotic state.

Regarding the curing of disease by suggestion or mind impression as the result of his studies, Charcot believed that

not all persons are proper subjects for miraculous healing, but only those whose maladies are capable of being influenced by the action of the mind on the body, that is to say the hysterical.

"Suggestion, either from outside or of autochthonous origin, is the therapeutic agent, and in suitable subjects, *i. e.*, the hysterical of either sex, the influence of the mind on the body is sufficiently powerful to bring about recovery from maladies which, but a short time ago, owing to our ignorance of their nature, were incurable."

Although we are unable to give a satisfactory and scientific reasoning of these apparently supernatural cures, we must acknowledge their existence, and ought, as conscientious physicians, to avail ourselves of them when other resources fail us.

A SENILE AND PYRAMIDAL CATARACT IN ONE SUBJECT.¹

BY GEO. F. SUKER, M.D., TOLEDO, OHIO.

IT IS not without some misgiving that I present this paper to the Society, because such cases are not as numerous as one might expect, hence little is or can be said, but much conjectured. It is for this reason that I present this paper for your consideration.

Whether or not the following case is unique I dare not assert; for, some of you may have had similar cases and could thus enlighten me on this subject which has deeply interested me for some time. Every possible source of information was resorted to, still, very little was found which had any direct or indirect bearing upon the question. Bear in mind that the literature is very scant upon the subject of the development or appearance of two distinct varieties of cataract in one eye.

Again, our literature upon pyramidal cataracts is very meagre. This may be said especially of the treatment. A mere mention of this kind of cataract and its treatment is given

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

in the text-books, and very little on the subject finds its way into our medical journals.

With these brief introductory remarks, allow me to cite the following case; and then let us theorize as to what can be and what ought to be done in like cases.

Mrs. S. M. C., aged 52 years, housewife; family and personal history good; never had any inflammatory trouble of the eyes. Her vision in the right eye has been good at all times. The vision in the left eye has been poor since childhood, *i. e.*, never could recognize objects well in a very bright light. Vision greatly improved in a modified light. Always noticed a little white speck in center of pupil. Began to lose her sight in right eye five years ago; left eye apparently remained the same. Consulted an oculist about this time, who earnestly advised her to let the eyes alone, as nothing could be done.

STATUS PRÆSENS.—Both pupils dilated regularly under homatropine.

R. E.—A fully developed senile cataract, very faint form perception. All else is as usual in senile cataracts.

L. E.—A small dense opacity in anterior capsule directly behind pupil. This opacity is not larger than two pin-heads. The center of this spot is denser than its periphery which gradually shades off into the capsule and lens. Fundus indistinctly seen on account of the apparent incipient senile cataract.

By oblique illumination, this central opacity projects into anterior chamber about 2 mm. presenting the appearance of a small cone. Anterior chamber normal in depth. Form perception under full mydriasis, somewhat better than in the right eye. The remaining portions of lens not as cataractous as the right. The dense opacity does not extend into lens substance proper to any great extent; neither is the anterior capsule wrinkled or corrugated as sometimes occurs in anterior polar cataracts. There is no doubt but that there is an evident deposit of chalky material in this dense opacity. The pyramidal cataract is in a line with the antero-posterior axis of the eye. The remaining portions of the capsule and lens do not reveal any interference of nutrition, only the lens is becoming cataractous throughout. It is to be taken for granted that a condition of amblyopia ex anopsia existed previous to the development of the senile cataract on account of the anterior polar cataract. There is no question but that this is a congenital

anterior polar cataract, not as a result of the usual corneal inflammation *in utero*. For, no corneal opacity could be detected by any method of examination, and no evidence of any iritic inflammation could be found. Whether or not there was an inflammatory implication of the ciliary body and processes, pure and simple, could not be determined upon. The tension in either eye was normal. The left eye, the one with the pyramidal cataract, turned outward about $2\frac{1}{2}$ lines. The cataract in the right eye was extracted with a fair amount of vision resulting. This hastened the cataractous process in the left eye. From the foregoing remarks, we can notice that this congenital anterior polar cataract can not be ascribed to the usual causes:

1. Corneal inflammation with infringement of lens upon posterior corneal layers.
2. Perforation of cornea, and the lens thus coming in contact with the cornea.
3. Some form of iritis with an exudate thus implicating the lens and capsule.

The only cause to which we can properly attribute this cataract is to a trophic disturbance in the anterior capsule causing a proliferation of cells, and secondarily, or perhaps, primarily implicating the lens substance back of it. But why was it so limited in its extent, this trophic disturbance of capsule? We have no means of determining whether this pyramidal cataract was formed before the anterior chamber was developed or not. In fact this seems to be a minor point in the question of the formation. Be this as it may, its ætiology is not that which is customarily ascribed to congenital pyramidal cataracts.

As to the ætiology of congenital pyramidal cataracts, nothing whatever as far as the writer can determine, is said about nutritive disturbances in lens and capsule being recognized as such a cause. Why this nutritive interference is so limited, if it is an ætiological factor, is yet an open question. For myself, I can not give a satisfactory solution. That it is to be considered as a cause can be seen from the above cited case. We can readily understand why the apex of this pyramidal cataract should extend into the anterior chamber and not into the lens substance, from the fact of least resistance being offered by the aqueous to this proliferating mass of cells.

When the wrinkled or corrugated appearance of capsule is present, the cataract is to be looked upon as a result of localized inflammation with an exudate and secondary contraction. That is to say, an inflammation limited to the anterior capsule exclusively. Even if the capsule has not this corrugation, the cataract may be considered as a consequence of localized inflammation of the capsule. What it is that gives rise to this inflammation of the capsule can not be determined on as yet. Finally, an intra-uterine iritis with a lymphoidal exudate may produce this variety of congenital cataract by the exudate being deposited upon the capsule and becoming united with the epithelium of the capsule. There is no apparent reason why an iritic inflammation of the above nature can not be considered as an ætiological factor. If it is due to this cause the chances are that the iris will show manifestations of inflammation when the child is born. Again, the question of heredity is not to be lost sight of. A few authorities lay considerable stress on this point. Can any weight be given to either of the above causes?

However, we can see that a congenital pyramidal cataract is not always necessarily the result of the lens coming in contact with an inflamed cornea *in utero*. Though it often results from this, in that during the earlier stages of the foetus no anterior chamber is present. But, if the cataract is developed in the last stages of foetal existence, an anterior chamber being present, it must be due to the former causes or perforation of cornea and then a distinct corneal opacity would supervene. No implication of cornea takes place in the former mentioned causes. So much for the ætiology of congenital anterior polar cataract.

Now as to their effect upon the acuity of vision, a word or two must be said. The majority of writers and authors maintain that little or no damage results as regards sight. This is very erroneous and decidedly misleading. An anterior polar cataract can not but help deteriorate vision to an appreciable extent. Its very position and nature will preclude the existence of good vision. In the above cited case the patient was cognizant of poor vision. Again, nystagmus may result if the cataract is bilateral; also convergence or divergence of the eye may occur with resulting amblyopia. Forsooth, the vision is greatly reduced if a corneal opacity co-exists with the

cataract. All admit damaging results to vision in these cases, but not any when the corneal opacity is minute or practically absent. Fortunately, an anterior polar cataract is more often unilateral than bilateral. Probably this may have influenced many authorities in saying that there is no evident effect upon vision. You can readily see how the size of the pupil and the extent of the cataract would influence good vision. However, if the polar cataract is not directly back of the pupillary area, but more towards the periphery of the lens, than its effect upon the vision is less manifest. That this is so is self-evident. Furthermore, a certain amount of lenticular astigmatism must be taken into consideration; this is a varying quantity.

In behalf of the treatment, the statements made by Fuchs, Knapp, Swanzy, and other equally good authorities are as ambiguous and inconsistent as their view upon the influence on vision. The greater majority of operators dispense with the subject by saying, "Treatment none." I beg to differ with all who make such a sweeping statement. For, there is a very efficient remedy for these cases, and good results gained if put into execution. Yet, suitable cases must be selected. An iridectomy for optical purposes will be as justified a line of procedure as removal of the lens in senile cataract. For the iridectomy make as small a corneal incision as possible, so as to avoid any very great amount of corneal astigmatism resulting. My experience with several cases allows me to make this statement. By performing an iridectomy, you restore a larger range of vision, avoid a tendency to amblyopia, nystagmus, divergence or convergence and make an excellent attempt for the restoration of binocular vision as it were. Are not these points worth while striving for? Are we not justified in attempting their achievement, other things being equal?

Happily for the patient, these cataracts are only partial and stationary; hence offer good results when subjected to an iridectomy, contraindications being excluded. I have operated upon three cases of this nature, one without any corneal opacity, and the other two with an opacity. And, I can modestly assert that I have achieved good results. Naturally, in the absence of corneal opacities, or when the corneal implication is rather slight, the operation yields very gratifying results. Certainly the amount of success obtained is very dependent upon the extent of the pyramidal cataract.

Finally, though it appears rather strange to have a genuine senile cataract develop in an eye which already possesses a congenital pyramidal cataract of the above description, yet, it is undoubtedly a perfectly normal sequence of pathological conditions. The one being local and limited, the other general, why should they not at times make their appearance in one eye? It is only a peculiar combination rather than an improbable or impossible one. Perhaps, too, I may be amiss in making this assertion, if so, I trust you will rectify the same.

In conclusion, allow me to recapitulate the salient points as follows:

1. An anterior polar cataract is damaging to the sight of the patient.
2. There is a suitable mode of treatment in certain cases, statements to the contrary notwithstanding.
3. That there are other conditions which give rise to anterior polar cataract than those usually found in text-books.
4. That senile cataract can develop in an eye possessing a polar cataract.
5. That the statements made by the majority of authors are misleading.
6. That the congenital variety is less frequent than the acquired and that it is more frequently unilateral than bilateral.

DISCUSSION.

DR. FRYER.—I want to congratulate the Doctor on his very admirable paper. I think the large majority of the oculists will agree with him as to the ætiology, and as to the practice in bettering these unfortunate conditions. I agree with what the Doctor states in regard to the positive interference with vision, and that the proper attention has not been given by prominent men to that point. If the iridectomy is done, I think the majority of oculists will agree in the necessity of its being done early or we will have the amblyopia, which the Doctor speaks of. Then it is too late. I believe that the Doctor does not state that this is always unilateral; that it is so in a number of cases. My experience is that in congenital cases, while there may be a difference in degree, yet there is usually a slight opacity in the fellow eye, even if it is not enough to interfere very materially with vision. But in the majority of

cases, I believe that both eyes are affected, although to a different degree.

DR. J. O. STINSON.—I wish to say that I am in accord with the views of this paper. I call to mind now two cases in which I made operations along the lines advocated by the Doctor, notwithstanding the fact that my early teaching was contrary to this line of practice. I have in mind now a case operated on as long ago as 1878. The child at that time was a boy of 7 or 8 years of age, and was brought to me as a blind child. I made an iridectomy. That young man to day holds a position as book-keeper in a prominent wholesale house, he travels everywhere, sees to do anything that anybody cares to do, and is enjoying good sight, and probably will as long as he lives. I have seen a number of these cases in the Indiana Institution for the Blind. They are sent there as blind people, and are regarded as blind people, and study the blind methods. When a patient of that kind remains in an institution for the education of the blind a number of years and learns to read by the blind method, the full advantage of the benefits to be derived by operation are not likely to be appreciated, and the friends of the patient are more or less likely to regard an operation as dangerous or risky. I can not see for my part why an iridectomy should be attended with any more risk under ordinary circumstances in a case of that kind than it should be in any other case where it is indicated. The other case was in a person in which I made a double iridectomy, with corresponding good results.

Now of course my idea is that the iridectomy ought to be small—not very large, and it ought to be made downward, provided the cornea is clear in this neighborhood, for the simple reason that when the eye will rotate down the palpebral margin will cover the deformity, and in that way we get a cosmetic effect which is beneficial, whereas, if the iridectomy is made upward this relief of the cosmetic difficulty will not be so apparent, neither will the sight be so good. As I intimated before, I do not see why, in these cases, unless there is some other lesion such as some retinal disturbance, an operation of this kind is not altogether justifiable, in fact why it should not be really recommended. My early teaching was against this operation in these cases.

DR. ALT.—I would like to say a few words on this subject

In the first place, I have heard a number of doubtful statements regarding older writers, and in the second place, I am astonished to hear that the early teaching of these gentlemen was against an operation in these cases. My early teaching was decidedly in favor of making iridectomy in the clearest meridian, a small iridectomy, just as we do in lamellar cataracts. But a number of cases in my own practice as well as in the practice of others, and of the best operators, have led me to be very careful about making iridectomy in any of the cases, unless I feel perfectly certain that good vision will result. I have seen quite often that iridectomies—well-made operations, and by the best operators—resulted in no improvement of vision. This fact we can quite readily understand. I believe that in all these cases of anterior polar cataract there exists also an irregular lenticular astigmatism and this astigmatism can not be taken into consideration when figuring on the result. My practice, therefore, has been instead of making iridectomy, to do away with the lens altogether, and I think that the results of such practice are eminently superior to the iridectomy for optical purposes in cases of anterior polar cataract. I have had an opportunity in quite a number of cases in my private practice and in several blind schools to operate in this manner and I do not think I have anything to regret. But I do regret that in a number of cases in which I performed iridectomy, and which promised good vision, no good result was obtained, and as I now believe, not because there was some other disease in the background, but in consequence of the irregular lenticular astigmatism which was present. That in cases of anterior polar cataract we should have irregular lenticular astigmatism is not to be wondered at. Here we have a crystalline lens with a cone in front of its anterior pole or near it, included in the lens capsule and bulging it out in an irregular manner. Sometimes it is even divided from the lens substance by a newly formed lens capsule at the back. The statement was made here that an iritis might cause anterior polar cataract. I do not see how this could be. We have to deal with a new product inside the lens capsule which may perhaps result from an intracapsular inflammatory process, but hardly from an iritis. So far as I know, and I have examined three cases histologically, there is some new-formed tissue in front of the real lens tissue inside the lens capsule and in this new-formed

tissue there may be found deposits of lime. The manner in which this tissue is formed we do not know. Then we have to deal with congenital polar cataract, but I believe it is due to some irregularity in the development of the original lens, before the anterior chamber is formed. That anterior polar cataract does also happen in consequence of anterior synechia of the crystalline lens I know from several cases in my own practice. I have several times seen anterior polar cataract develop in consequence of perforation of the cornea in children. Yet I think the very fact that in most cases, as far as my experience goes, anterior polar cataract is binocular, shows that we have in such cases to deal with congenital ones and that they are in all probability not due to perforation of the cornea—that is, an intra-uterine ulceration of the cornea, as O. Becker assumes. As I say, however, I have seen anterior polar cataract develop under my eyes after corneal perforation in childhood.

DR. BARK.—My views are like those of Dr. Alt's. I think only in the minority of cases of iridectomy will we get good results, so far as vision is concerned, and the reason for this is, the irregular lenticular astigmatism. In all sections published of such cases there is around the cone periphery a very irregularly curved anterior lens capsule and only the most peripheral portions are relatively smooth. This is the explanation of bad vision in the majority of cases. And this is not improved by an iridectomy. Still I believe that in many of these cases iridectomy may be tried first, and if the result is not such as it should be, the only proper procedure would be their removal of the entire lens by one method or another.

DR. ALT.—In answer to Dr. Bark's remarks I would say that I do not think it wise to first make iridectomy and, if no good results, make an operation for the removal of the lens, because after the iridectomy you have a maimed pupil and post-operative corneal astigmatism and vision can not then be as good after the removal of the lens, as it might have been without iridectomy.

DR. WHEELOCK.—The remarks of Dr. Alt and Dr. Bark have recalled to my mind a case of anterior pyramidal cataract in which I was requested to operate for optical purposes. I selected for the best site of the operation a downward and inward direction. Before I made the operation I se-

cured a complete dilatation of the pupil, attempted to correct any possible astigmatism, and succeeded in getting vision from $\frac{10}{6}$ to $\frac{10}{1}$. I advised an iridectomy downward and inward, and performed the operation very cleanly; I got a very nice result from a surgical standpoint, but, I am very sorry to state, when I came to adjust the lens I failed utterly in securing any useful vision. While I had got it in my office before the operation, glasses afterwards were of no use. I believe that lens-astigmatism will stand in our way of success in most of these cases. At any rate, whatever is done should be done very early in the life of the child.

DR. COLBURN.—My experience with iridectomy in such cases has been rather limited, but I was also so unfortunate as to have failed in getting good results from the operation; and I have found that the needling and destroying of the lens by absorption promised and gave me the best results, so that unless I am sure of a good result I would not perform iridectomy. The Doctor making the last remarks touches the key-note of our failure in giving a correction after we have made an iridectomy. We may get a theoretical correction before the operation, but when it comes to applying the glasses afterwards, I do not think we often accomplish much. My experience is fully like Dr. Alt's—in favor of the needling operation. I think if it is done early we will have good results; in later life we have to make the best of a bad matter. Within the last two years I have ripened such a lens, after Foster's method, and then extracted, and I have had a very good result.

A GENERAL CONSIDERATION ON THE ETIOLOGY AND TREATMENT OF CHORIOIDITIS NON-SUPPURATIVA.¹

BY WILSON E. DRIVER, M.D., NORFOLK, VA.

TO APPEAR before such a distinguished medical body, I am proud of the privilege, and to be allowed to partici-

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

pate in the deliberations of this scientific congregation is to me a great compliment.

While I have brought no "Jewel from the East," it is my desire, in presenting the subject which I have selected, simply to open a discussion among the physicians present which will benefit all and from which I shall gather valuable information.

Chorioiditis non-suppurativa is the most common, fatal disease seen by the eye surgeon; still, strange to say, little literature exists upon the subject: so little is written in the text-books, and so seldom do we see the subject mentioned in the journals, I take it the consideration it deserves it is yet to receive. Soelberg Wells, Fuchs, Noyes, and others speak of chorioiditis as a common and grave disease; the student, though, can but be impressed with their succinct mode of dealing with this all important subject. The want, too, of innumerable hypotheses as to cause and treatment, is strikingly conspicuous.

Numerous subdivisions have been made, and names given to the forms of chorioidal lesion, all of which are based upon the peculiarities of location and arrangement. Is it not high time that our attention be turned to the etiological factor, and to it should not our nomenclature have some regard? This once accomplished, our treatment will soon be on a more rational basis, and results much more gratifying.

Other diseases occurring in persons robust and otherwise healthy, and without obvious cause, are usually attributed to divers constitutional conditions, but chorioiditis is invariably put down as being a result of either inherited or acquired syphilis.

In my personal experience, so large a percentage of eyes affected with this disease, after an active, anti syphilitic treatment, have gone to the bad, that I am compelled to think that the true cause is as yet unknown. I have long since found it necessary to look for some other cause. It is true, we do see chorioiditis due to syphilis, but in these cases we invariably see other manifestations of the disease, and are sometimes successful in getting a syphilitic history.

Chorioiditis disseminata and serous chorioiditis were the subdivisions of chorioiditis non-suppurativa made by Dr. Adolf Alt in his clinical report of eye diseases treated at the New York Ophthalmic and Aural Institute in 1876. These are two

forms that will concern us in this paper. It is to the former that I first invite your attention.

In this disease (chorioiditis disseminata) an anti-syphilitic treatment always proves more or less a specific. Merely from the structure of the choroid we should expect it to be often the seat of the disease. It seems to possess few or no sensory nerves, since inflammation of this membrane usually runs its course without producing any sensation of pain. The eye looks normal externally, and the disease manifests itself to the patient only through the disturbance of sight, and the physician recognizes it only through an ophthalmoscopic examination. So long as the inflammation is recent, symptoms of the irritation of the retina manifest themselves in sensations of light, such as spots before the eyes, sparks, balls of fire, etc. The patient is usually seen by the specialist after the symptoms have existed for several weeks. If the case come under his observation in the beginning, by an ophthalmoscopic examination he sees yellowish, distinctly outlined spots which lie beneath the retinal vessels upon the red fundus oculi. These spots are scattered, more or less, all over the fundus. They are small, circumscribed, isolated, and do not exhibit any tendency to coalesce, even when they are grouped closely together. The yellow matter is the exudate which hides the red of the normal choroid. Resorption may take place at this stage, leaving the choroid more or less atrophic, and the places converted into cicatricial connective tissue. Usually, though, our patients are seen in a later stage of the disease, in which the retina is involved, the exudate passing not only into the superimposed retina, but also through the latter into the vitreous. Opacities of the vitreous thus produced are hence an almost constant accompaniment of chorioiditis, and with the ophthalmoscope the diagnosis is made. The course of this form of chorioiditis is chronic, opacities lasting for many months. The prognosis must be guarded, though in a large majority of cases we are able by an active treatment to preserve useful vision, and as the treatment must have regard mostly to the etiological factor, I can but urge an energetic anti-syphilitic treatment.

Sometime since, Dr. Robert L. Randolph, of the Johns Hopkins Hospital, reported two cases of very pronounced disseminated chorioiditis, with preservation of the normal acute-

ness of vision. He attributed the disease to syphilis, but could not establish a syphilitic history.

This condition, with all that is characteristic of syphilis, demands the same treatment: Iodide of potash, mercury in its various forms, and especially is recommended treatment by inunction. The cachectic and anæmic will be much benefited by cod liver oil and the ferruginous tonics.

Now, as to chorioiditis centralis, or serous chorioiditis. Undoubtedly, its names have been based solely upon its peculiarity of location and arrangement. It, too, has been attributed to syphilis, and the principal treatment has been an anti-syphilitic one.

Mr. Hutchinson has classified all chorioiditis into twelve groups; still I do not find this special form among them. Of those he mentions the third and fourth alone concern us in this present inquiry. The third class is senile chorioiditis, or Tay's chorioiditis, always central, and met with in those past middle life. The fourth, or hereditary chorioiditis, varies in form, often beginning in childhood, but sometimes not until middle life. Several members of the same family are affected, and the changes are usually aggressive, without syphilitic history. As the form under consideration is neither senile nor hereditary, it does not fall under Hutchinson's classification.

In serous chorioiditis the patient's attention is directed to the eye by various disturbances of vision. As to the differential diagnosis from chorioiditis disseminata it can not be made on the subjective symptoms, as they are practically the same, save more intensified.

The implication of the choroid and retina in the region or at the macula lutea seriously modifies the vision and causes a secondary scotoma. The vision is diminished as a whole, too, on account of the cloudiness of the vitreous and hyperæmia of the retina.

The patient is generally robust, strong and healthy, and usually between the ages of eighteen and thirty-five years. It is seldom that both eyes are affected at the same time, in contradistinction from chorioiditis disseminata, which is usually a bilateral disease.

We practically never see the patient at the beginning of the disease, and even if we did see him at the very beginning it is not probable that we should recognize the pathological

conditions, as the structural changes in the choroid, so long as they are confined to its deeper layers, and, therefore, at the commencement, are almost entirely concealed by the pigment layer of the stroma. Later on, pathological conditions are concealed from view by development of secondary conditions, such as turbidity of the ocular media, floating bodies in the vitreous, and small opacities on the posterior wall of the cornea. These small particles of pigment that are simply stuck on the posterior surface of Descemet's membrane should not be mistaken for keratitis punctata, as keratitis punctata is commonly associated with, and frequently seen, in chorioiditis disseminata.

Differential diagnosis, from chorioiditis disseminata: No specific history and no visible manifestation of syphilis. Patient in every other way healthy; small spots on posterior surface of cornea (keratitis punctata in chorioiditis disseminata); anti-syphilitic treatment of little or no effect.

It seems by common consent that the etiology of serous chorioiditis is a mystery. Dr. George M. Gould, of Philadelphia, attributed the disease to ametropia (especially compound hyperopic astigmatism), and reported many cases to illustrate his theory. Most writers have attributed it, along with other diseases of the chorioid, to syphilis.

I have looked upon the disease as being of rheumatic origin, from its resemblance to, and common association with, spongy iritis. My treatment has been the same, and results have been fairly satisfactory.

From the location of the disease the prognosis is necessarily unfavorable. When the optic media are cleared, we find large central atrophy or atrophies, and a serious modification of vision, it being of no practical use in many cases, though a number of cases have been reported in which acuteness of vision has been preserved. Nettleship reports a case of severe central chorioiditis with almost perfect acuteness of vision. In February, 1893, Darier reported a case in which vision was brought up to normal by a subcutaneous injection of corrosive sublimate.

As to treatment; I rely upon blood-letting, the Japanese hot box, and salicylate of soda. In recent cases with hyperæmia of the retina five or six leeches are applied behind the mastoid process, or abstraction of blood is made with Heurte-

loup's artificial leech. The glass cylinder is filled with blood two or three times. If there is pain, the grateful hot box is applied. The patient is at once put on salicylate of soda, 15 to 20 grains every three hours, day and night. I look for speedy clearing up of the vitreous and a disappearance of all unpleasant symptoms.

DISCUSSION.

DR. CORR.—I wish to speak in commendation of the paper, and also to record my hearty indorsement of the doctrine which the gentleman has maintained. The puzzle which presented itself to him is one which also presented itself to me when I first began the study of ophthalmology. I was struck with the fact that the books and teachers said that almost all forms of chorioiditis were of syphilitic origin. It is needless for me to say that in several papers which I have read before different associations and which have been published I have maintained that the trouble may arise irrespective of the existence of syphilis, and that these cases will get well without anti-syphilitic treatment. I do not know what its origin is, probably in many cases rheumatism, but the idea of prescribing mercury and iodide of potassium in chorioiditis has struck me as something like the statement of Dr. Noyes, who records in his book, that in some new game of cards, when you do not know what else to do, play your trumps.

DR. TIFFANY.—I just want to add to what Dr. Corr has said, that chorioiditis, in my opinion, does not always have its etiology in syphilis. I have found it due, as I thought, to consanguinity. Why this should be I do not know; the offspring of cousins, in my observation, almost always have chorioiditis.

DR. SUKER.—I think Dr. Driver is to be complimented on the clear expression of his views in the paper. All the younger ophthalmologists, I suppose, have experienced the same trouble he did in this matter. I did. As regards every case being syphilitic, I oppose it. I do not see how it can be. I know it is generally the custom for the younger men to follow the dicta and statements of the older members of the profession. I have had occasion to see in a large clinic many cases of chorioiditis—of eye trouble in syphilitics, but I have also seen many cases where there was no trace of syphilis. Often mer-

cury has a good effect, but I always give strychnia with it, and with good results.

DR. DRIVER. — I have not much to say in closing. I brought this subject up because I think a large number of patients are treated on the theory that they have some remote form of syphilis and I think we are too much in the habit of putting our patients on anti-syphilitic treatment; it does not matter who the patient is, if he has a chorioiditis we adopt as a routine treatment anti-syphilitic treatment—in other words, we prescribe mercury and iodide of potash. I think a differential diagnosis should be made in these cases as it is such a grave thing—such a serious thing, to pronounce a case syphilitic. That was my object in presenting the paper. It seems that the teachers in the country are in the habit of teaching that chorioiditis is due to syphilis. I was for a time resident physician at a hospital in Baltimore in connection with which there was a large clinic, it was an eye and ear hospital, and for several years while I was there, although in our syphilitic cases we could find syphilitic iritis and other manifestations of syphilis, it was seldom we saw a chorioidal lesion, and especially the acute form, which comes to your office with a disturbance of vision of a few weeks' duration.

ON RETARDED CLOSURE OF THE WOUND, AND SOME RARE ACCIDENTS AND SEQUELÆ OF CATARACT EXTRACTION.¹

BY CARL BARCK, M.D., ST. LOUIS, MO.

WITHIN the last years, I have observed the following three cases of unusually slow closure of the wound after extraction:

CASE I.—Captain G., aged 52 years, was operated on in the spring of 1893 for a mature cataract of the right eye. Patient was in perfect health. The operation performed was

¹ Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

simple extraction, and was easy, and perfectly normal. The anterior chamber failed to become re-established at the usual time; it remained absolutely empty. The wound was clean and free from iris, capsule or lens substance; the pupil small and perfectly round. There was never any irritation around the lips of the wound nor any pain. Spastic entropium of the lower lid could never be noticed during change of bandage. The wound simply did not unite, and this not only partially, but in its entire extent. Upon the slightest pressure with the lower lid against the cornea, it gaped from one end to the other. In spite of eserine, compressive bandage, and strict rest, this state of affairs continued unaltered for eighteen days. Constitutional disorders were inquired into, the urine repeatedly examined for albumen and sugar, without result. By an unfortunate accident on the mentioned date, infection took place, and the eye was lost by suppuration of the cornea.

CASE II.—In May, 1895, the patient returned, the cataract of the left eye having become mature in the meantime. The simple extraction was again perfectly smooth and regular, but the identical course of healing took place as before in the other eye. The wound did not close, the anterior chamber remained empty for more than two weeks. No cause for the retarded closure could be found. Never the slightest symptoms of irritation. Again the urine was examined, without result. I do not need to mention that extraordinary precautions were observed during the after-treatment. On the nineteenth day, at last, the anterior chamber was found to be re-established. The bandage could be discarded on the twenty-fifth day and the patient dismissed soon afterwards with a round pupil, and a vision of nearly $\frac{6}{7}$.

CASE III.—B. H., a gentleman aged 73 years, was operated on in September, 1896. Cataract not fully mature. Iridectomy. The anterior chamber remained empty, at first entirely, and later on nearly so for two weeks. This was due to a leakage of a small area in the outer portion of the wound, where a small piece of capsule had been caught between the edges of the wound, preventing their union. I was frequently tempted to reopen and remove the piece, but the patient was very nervous, so I abstained and relied on compressive bandage and atropine. The wound closed finally, the condition having given rise to a slight iritis, which abated under the

usual treatment. Immediate result, fairly good; after discission, V. = $\frac{6}{12}$.

I believe that the conservative course pursued is the best one in these instances, and that operative interference is not indicated.

The modern text-books by Roosa, Fuchs, Schweinitz, Norris-Oliver, Berry, Noyes, Juler, Fick and Panas are silent upon the subject under consideration. Besides an occasional remark by Berry, to which I will return hereafter, the only reference to cases of retarded closure of the wound which I find in the literature at my disposal, is by Becker, in "Graefe-Saemisch's Hand-Book," Vol. V, page 361. He says:

"In rare cases the wound does not close on the first day, so that the anterior chamber is found empty at each visit. I have seen such a condition (which is well known to us from our operations for glaucoma) last from five to six days, even after perfectly normal extractions. Jacobson reports a case, in which the wound did not close before the fifth week. The eye, as a rule, does not present any symptoms of irritative reaction, and the termination is a favorable one. I therefore consider a late re-establishment of the anterior chamber as a rather favorable circumstance, as to the final result. The impression to be gained is not that the wound would remain open in its entire circumference, but that there is a leakage at a very small area, through which the aqueous escapes, either continuously, or at intervals. If a conjunctival flap has been formed, the escape of aqueous is recognized by the œdema of the conjunctiva due to infiltration. If the section has been made entirely in the cornea, this symptom is wanting. But on the other side œdema through infiltration may be present, and the anterior chamber re-established. This takes place if the escaped aqueous within the conjunctival tissue is under a pressure equal to the intra-ocular pressure. If in such instances the conjunctiva is punctured, the anterior chamber will become emptied also. The conclusion, that the wound does not remain open in its entirety, rests upon the experience that the appearances at the lips of the wound take the normal course as mentioned above. Surely, it might be conjectured, that the place where the wound remains open, would be characterized by a circumscribed inflammation. But I could never find such a place. The cause of a retarded closure may be due to the

wound, if it happened to be jagged, giving rise to an incomplete apposition of the edges. But a more frequent cause is probably the fact that remnants of the lens or of the capsule become lodged in the wound, and keep it gaping, and make an escape of aqueous around them possible."

My last case is a plain illustration of this category.

Becker adds furthermore: "These cases, with a good prognosis, must not be confounded with those in which an increased intra-ocular pressure is the cause of the retarded closure. In these, there exists the dangerous complication of an overlooked or newly-developed glaucoma."

This complication is evidently out of question in the first two cases which I have reported, and the remarks by Becker give as little explanation as I can offer myself. There was no constitutional diathesis and the patient in usual good health when seen lately. There was never any foreign substance between the lips of the wound, never inflammatory symptoms, and the result in the one eye good, and would most probably have been similar in the other, had no infection taken place.

The case is unique, in so far as the slow closure occurred in both eyes in an identical manner, the operations being done three years apart. The only case in which the wound did not close for the same, or even a longer period, is the one of Jacobson, mentioned by Becker, and is attributed by him to blepharospasm. His report in *Graefe's Archives*, Vol. XI, p. 194, is as follows:

"I recollect an old forester, upon both eyes of whom I had operated with good result. The patient had some blepharospasm and the aqueous of the left eye escaped regularly, as often as I left the bandage off, during the first three weeks. After I had convinced myself of the constancy of the condition, I kept the eye closed by compressive bandage for ten days and nights in succession, after which time the wound was closed."

As to this treatment, Berry, to whom I alluded previously, gives the opposite advice. He says in his text-book (latest edition) page 690:

"The wound has generally so far healed by the time the first dressing is changed, as to have permitted the chamber to become re-established. If there should be no chamber after two days, an unusual, though occasional occurrence, it is bet-

ter to remove the bandage and replace it by a light one, which exerts no pressure at all upon the eye."

I have followed in the treatment of my cases the example of the first author. But I believe that the point of Berry is well taken for cases of spasmodic entropium of the lower lid, under the bandage. These occurrences are not rare. I have witnessed them repeatedly, and most of you probably also. If the lower lid can not be prevented from inverting by colloidion, it is advisable to leave the bandage off as soon as admissible. But I have never seen that this spasmodic entropium interfered with the closure of the wound and re-establishment of the anterior chamber. Jacobson's case seems to be the only one on record as far as this consequence is concerned.

To sum up:

The most frequent cause of unusually slow closure of the wound are foreign substances, iris, vitreous or capsule within the edges of the wound.

A rare cause is blepharospasm and spasmodic entropium of the lower lid.

In some instances, as in the two cases reported, a satisfactory explanation is still wanting. (Perhaps one of the gentlemen present is able to give it).

The treatment in the first and last category of cases, consists of a well applied compressive bandage, and strict rest. Operative procedures for removing foreign substances from the wound are rarely indicated.

In instances of spasmodic entropium the measures are directed against this condition.

Extraction of cataract, after the discovery of cocaine and with the introduction of aseptic methods, is considered to-day as a relatively simple operation, and our losses have since been reduced from 3 to 2 per cent. But from time to time unexpected conditions and emergencies may be encountered, which must be recognized immediately, and the best course of action quickly decided and acted upon. Not all of such accidents are mentioned in the text-books and each operator may find himself face to face with a complication that he has never heard or read of. In the July number of the *Archives of Ophthalmology*, 1896, Dr. Oliver, of Philadelphia, reported a number of such cases and I thought it would not be without value

to collect and place on record those which I happened to meet with in my practice of 13 years.

CASE I. *Breakage of Point of Graefe's Knife in Anterior Chamber.*—In April, 1885, I extracted the mature cataract of an elderly lady. The Graefe knife, which had never been used before, had been sterilized in absolute alcohol and tested by the usual method, without observing anything particular. The entrance puncture did not meet with any difficulty. The patient then made a slight motion with the eye, and at the attempt of the counter-puncture the point of the knife broke off, and fell to the bottom of the anterior chamber. I withdrew the blade without loss of aqueous humor, took another knife, entered through the original wound and completed the section as usual. Then after admonishing the patient to keep the eye as quiet as possible, I entered with the iris forceps, caught the broken-off piece at the first attempt and withdrew it. The subsequent steps and the healing process were regular, with good final result.

The broken piece was slightly over one millimeter long. On inspecting the fracture line of the knife with a magnifying glass, it presented a small oblong space in the center, somewhat excavated, which looked rough and dissimilar to the smooth edge surrounding it.

Dr. Oliver (*Loc. cit.*) has reported a case where a minute fragment of Graefe's knife broke off at the counter-puncture and remained imbedded in the sclera. Attempts of removal with magnet and iris-forceps failed; and he left it *in situ*, extracting the cataract subsequently. It never afterwards gave rise to irritative symptoms.

CASE II. *Spontaneous Ejection of Lens Into the Air in an Unruly Patient.*—An old nervous gentleman, operated on in the spring of 1894, proved to be so unruly at the commencement of the operation, that I changed the screw speculum for a Desmarres' speculum, held by the assistant. Simple extraction. Immediately after the capsulotomy he squeezed so forcibly that the total lens was ejected, rising at least one foot in the air, and falling down upon the patient's head. The speculum was quickly withdrawn. No escape of vitreous. On inspection some time afterwards, it was found that the cornea had collapsed entirely. But no prolapse of iris, pupil round. The eye did well until the fourth day, when on account of the

behavior of the patient, a partial opening of the wound took place, into which the iris became lodged, causing iritis and closure of the pupil. A subsequent iridotomy brought the vision up to $\frac{6}{L}$.

Cases of this kind are not so rare. Had the speculum not been exchanged in expectation of some irregularity, loss of vitreous would have occurred most probably. In a similar instance, in the future, I would add an iridectomy secondarily, if simple extraction has been attempted at first.

CASE III. *Extraction of a Hypermature Cataract in an Alcoholic. Delirium. Two Traumatic Hæmorrhages on Fourth and Seventh Days. Recovery.*—The patient, aged 58 years, was a saloon-keeper, but he did not exactly make the impression of a drunkard. The attempt to remove within the capsule the hypermature somewhat shrunken cataract of twenty years' standing failed, and the small nucleus and detritus was removed after capsulotomy. The course of healing during the first three days was regular, and after the second day the patient was allowed a moderate quantity of stimulants. In the night between the third and fourth day he became delirious and injured the eye by a heavy blow with his own hand. The next morning the bandage was saturated with blood, the wound partially gaping, and two-thirds of the anterior chamber filled with blood. The origin of the hæmorrhage could be traced to one of the edges of the iris, made by the iridectomy. The following days were exciting; but under the usual treatment and careful attention by nurses the wound closed again and the hyphæma became smaller. No undue irritative symptoms had set in. In the night between the seventh and eighth day he became more delirious than ever, and while combatting with the attending nurse, during an attempt to get out of bed, the eye received a second blow. The wound was open in nearly its full length the next morning, and the entire anterior chamber was filled with blood. I removed a certain quantity of it by mild pressure upon the lower edge of the cornea, and gave a rather gloomy prognosis. But even then no inflammation set in, the wound became reunited, and the blood was re-sorbed during the next week.

Final result $\frac{6}{XXXVI}$ with a black pupil. On account of an old corneal opacity this was about the highest result to be expected.

I have since extracted the mature cataract of the other eye without accident and full result of $\frac{6}{71}$, after the patient had observed strict temperance for some months prior to the operation.

CASE IV. *Cataracta Lactea Without Nucleus in an Adult.*

John N., Italian, aged 51 years, presented himself six months ago, with a mature cataract in the left and semi-mature in the right eye. Vision in the left eye had commenced to fail two to three years previously. I inquired into this point closely after the operation, and he was positive that he could see with the eye three years ago as well as ever before. The appearance of the lens presented the usual picture of a mature, cortical cataract.

Simple extraction. After the capsulotomy a white milky fluid filled the anterior chamber and poured from there through the wound. My first thought was, that I had to deal with a Morgagnian cataract, and I waited for the nucleus to make its appearance. But no trace of such could be seen.

The pupil became deeply black immediately after the escape of the milky fluid. Healing process regular. A discission of the web-like capsule on the eighteenth day brought the vision up to $\frac{6}{111}$.

Cataracta lactea is most frequently congenital; besides it is sometimes met with in young individuals where no distinct nucleus has yet formed and where in consequence after a term of years the whole lens substance becomes liquified with more or less shrinking of the capsule.

In adults the cortical substance only may become liquid, whilst the hard nucleus withstands the condition, called Morgagnian cataract. Of cataracta lactea at the age of 51 I could not find another single instance in the literature at my disposal.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

OCTOBER, 1897.

NO. 10.

ORIGINAL ARTICLES.

CASES OF OPHTHALMIA NEONATORUM.¹

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I DO NOT claim anything new or rare in reporting these cases, because they are quite common in all our large cities. The chief object in reporting these cases is to show that by careful examination of the discharge from the eyes, a great many cases are found not due to gonorrhœa; also when the gonococci were found in the eye discharge, the disease lasted longer and was much harder to treat. And in some cases in which no gonococci were found, the disease was made worse by improper previous treatment, and rapidly got well under proper and milder treatment, in less than half the time.

The chief characteristics, or the ones that I depend my diagnosis on in making microscopical examinations is not only the shape and size of the diplococci, and that I find them inside of the cell surrounding the nucleus or inside of the pus-cell, but chiefly on their not taking on the staining by Gram's method, as we have quite a number of diplococci that are nearly of the same size and shape, which are sometimes found inside of the cell surrounding the nucleus, either by accident or not. But every one of these diplococci is stained by the Gram method, while the gonococci are not stained by that method.

¹Read at the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

CASES OF OPHTHALMIA NEONATORUM.

<i>Case.</i>	<i>History.</i>	<i>Condition.</i>	<i>Treatment and Result.</i>	<i>Mic. Examination.</i>
1	T. V., aged 6 days. Both eyes sore since 3 days after birth. Mother had a purulent discharge during her pregnancy, father had gonorrhea 3 months prior to his marriage, but was cured in 2 months. So he says he was well when he married.	Lids swollen, marked chemosis of ocular conjunctiva, profuse discharge of pus from both eyes, cornea clear.	Nitrate of silver gr.x- $\frac{3}{32}$ twice a day, neutralized, boric acid gr.x- $\frac{3}{32}$ to keep the eyes constantly clean, ice cloth, bichloride vaseline $\frac{1}{10000}$ to the eyelids. Discharged in five weeks, right cornea clear, left opacity.	Gonococci in the eye secretion, also in the mother's lochia.
2	S. P., aged 5 days. Both eyes sore, affected 2 days after birth. Mother a prostitute, had gonorrhea about twice, and got it again when she was in her third month of her pregnancy.	Lids very swollen, marked chemosis of ocular conjunctiva, profuse discharge of pus, cornea clear.	Nitrate of silver gr.x- $\frac{3}{32}$ twice a day, neutralized, boric acid gr.x- $\frac{3}{32}$ to keep the eyes constantly clean, ice cloth, bichloride vaseline $\frac{1}{10000}$ to the eyelids. Discharged in five weeks, both cornea clear.	Gonococci in the eye secretion, also in the mother's lochia.
3	P. D., aged 6 days. Infant's eyes sore since 2 or 3 days after birth, mother not married, she says she never had gonorrhea, but had since the second month of her pregnancy a profuse purulent discharge.	Lids swollen, chemosis of ocular conjunctiva, profuse discharge of pus, cornea clear.	Nitrate of silver gr.x- $\frac{3}{32}$ twice a day, neutralized, boric acid gr.x- $\frac{3}{32}$ to keep the eye constantly clean, ice cloth, bichloride vaseline $\frac{1}{10000}$ to the eyelids. Second week right cornea slightly steamy. Used atropine, but gradually improved. Discharged in five weeks, right cornea, slight opacity, left clear.	Gonococci in the eye secretion, none in the mother's lochia.
4	C. B., aged 5 days. Eyes sore since second day after birth. Mother had a purulent discharge during her pregnancy. Father had gonorrhea, and at present the gleet. The previous child two years ago had ophthalmia neonatorum. Both eyes lost with leucoma. Mother died during an operation for salpingitis about 5 months after her confinement.	Lids very swollen, chemosis of ocular conjunctiva, discharge of pus. R. C. clear, L. C. steamy.	Nitrate of silver gr.x- $\frac{3}{32}$ twice a day, neutralized, boric acid gr.x- $\frac{3}{32}$, to keep the eyes constantly clean, ice cloth constantly except at midnight. Bichloride vaseline $\frac{1}{10000}$, atropia to the left eye. Discharged in six weeks. R. C. clear, L. C. opacity.	Gonococci in the eye secretion and also in the lochia.

5	L. R., aged 1 week. Eyes affected 3 days after birth. Mother had a yellow discharge from the vagina for 4 months prior to her confinement. Mother multipara. Previous children healthy. Could not get history from husband.	Lids very swollen, slight chemosis, profuse discharge of pus. R. C. steamy, L. C. clear.	Nitrate of silver gr.x- $\frac{3}{32}$, bichloride sol. $\frac{1}{10000}$ to keep the eyes constantly clean, ice cloth, bichloride vaseline $\frac{1}{10000}$ atropia to L. E. Discharged in six weeks. R. C. clear, L. C. opacity.	Gonococci in the eye secretion, not found in the lochia.
6	W. McC., aged 3 days. Eyes affected second or third day after birth. Mother multipara. Previous children healthy. She always had more or less leucorrhoea, and would get worse when she became pregnant and especially the later month. Father had gonorrhoea 3 or 4 times before he was married.	Lids swollen, chemosis of ocular conjunctiva, profuse discharge of pus. R. C. clear, L. C. steamy.	Nitrate of silver gr.x- $\frac{3}{32}$ twice a day. Bichloride sol. $\frac{1}{10000}$, ice cloth constantly applied, bichloride vaseline $\frac{1}{10000}$, atropia gr. j- $\frac{3}{32}$ to left eye. Third day the R. C. was also steamy, and an ulcer formed on the left eye. As it was on the periphery of the cornea used eserine. For the right eye atropia. Fourth day discharge has diminished somewhat, but ulcer in L. E. perforated. Continued the same treatment except the ice cloth. Discharged in six weeks. R. C. slight opacity, L. C. small leucoma.	Gonococci in the eye secretion, none in the mother's lochia.
7	C. D., aged 9 days. Few days after birth eyes affected. Mother had 3 children. The first child's eyes healthy, second child had ophthalmia, and also the last one. Mother had the whites, which got worse during the later month of her pregnancy. Father refuses to give history.	Lids swollen, chemosis of ocular conjunctiva, profuse discharge of pus. R. C. clear, L. C. a central ulcer.	Nitrate of silver gr.x- $\frac{3}{32}$, neutralized, bichloride sol. $\frac{1}{10000}$ to keep the eyes constantly clean, bichloride vaseline $\frac{1}{10000}$, ice cloth for the right eye, and atropia for the left eye. Second day, ulcer L. C. perforated. Stopped atropine, the same treatment continued. Fifth day, discharge diminishing. Discharged in six weeks. R. C. clear, L. C. leucoma.	Gonococci in the eye secretion, none in lochia.
8	T. C., aged 8 days. Three days after birth right eye and the left eye on the fourth day became affected. Mother had leucorrhoea; not married, so could not get history of father.	Lids very swollen, chemosis of ocular conjunctiva, great injection of conjunctival vessels. Both corneae steamy.	Nitrate of silver gr.x- $\frac{3}{32}$, neutralized, bichloride sol. $\frac{1}{10000}$ to keep the eyes constantly clean, ice cloth. Second day the discharge was not so profuse. Third day ulcer formed on both corneae. Stopped the ice cloth and used atropine. Fifth day L. C. ulcer healing, R. C. perforated, discharge greatly diminished. Discharged in five weeks. R. C. leucoma, L. C. central opacity.	Gonococci in the eye secretion. Patient refused to have lochia examined.

9	C. M., aged 6 days. Eyes affected 3 days after birth. Mother primipara; she had the whites off and on for years, but when she became pregnant she had a yellowish discharge, which gradually got worse during the later months, so that she had to be treated for it. Father had gonorrhea several times, and had it at this time; but he says since he got it, he had not had any connection with his wife.	Eyelids greatly swollen, chemosis of ocular conjunctiva, conjunctival injection, profuse discharge of pus. Both corneae clear.	From the day the eyes were affected, they were intelligently treated by Dr. Upman, who called me to take charge of the case. Used the same treatment as the above cases. Discharged in five weeks. R. C. slight opacity, L. C. clear.	Gonococci in the eye secretion, also in the mother's lochia, and father's urethral discharge.
10	C. L., aged 2 weeks. Eyes affected the third day after birth. Mother had three children, none had sore eyes except the last one. Mother had leucorrhoea, and would always get worse the last of her pregnancy. Could not get history from the father. Treated with tea leaves, salt water, etc.	Eyelids greatly swollen, chemosis and injection of ocular conjunctiva, profuse discharge of pus. R. C. ulcer, L. C. very steamy.	Treatment the same, except for the R. E., used eserine; L. E., atropine. Third day discharge diminishing, but ulcer perforated; L. E. ulcer formed. Discharged in six weeks. Right leucoma adherens, L. C. opacity.	Gonococci in the eye secretion, none in the mother's lochia.
11	F. R., aged 10 days. Eyes affected third day after birth. Mother primipara; had leucorrhoea, but from the sixth or seventh month had a profuse discharge. Husband says he never had gonorrhoea. Treated with breast milk, tea leaves, bread poultices, etc.	Eyelids swollen, slight chemosis of conjunctiva, profuse discharge of pus. R. C. steamy L. C. ulcer.	Nitrate of silver gr.x-3j, neutralized, boric acid gr.x-3j to keep the eyes constantly clean, bichloride vaseline $\frac{1}{1000}$ to the eyelids, ice cloth to R. E., atropine for both. Second day R. C. ulcer forming, L. C. perforated, but the discharge greatly diminished. Same treatment continued, except the ice cloth. Discharged in three weeks. R. C. opacity, L. C. leucoma adherens.	No gonococci found in eye secretion or lochia.
12	G. P., aged 12 days. Eyes affected third day after birth. Mother had 6 children, none of them had sore eyes. Mother had leucorrhoea once in a while. Husband says he had never had gonorrhoea. Previous treatment, tea leaves, sugar, and water.	Eyes swollen, ocular conjunctivitis injected, discharge of pus. L. C. slightly steamy, R. C. clear.	Treatment the same as the previous one. Second day discharge greatly diminished. Continued the treatment the same, except nitrate of silver gr.v-3j. Fifth day discharge stopped. Same treatment continued, except nitrate of silver. Discharged in 2 wks. Both corneae clear.	No gonococci found in eye secretion.

13	J. F., aged 1 week. Three or four days after birth eyes affected. Mother primipara. She says she never had any discharge or whites. Husband could not be seen. Previous treatment, breast milk, tea leaves.	Eyes swollen, conjunctiva injected, discharge of mucus in abundance. Both corneae clear.	Treatment the same as the previous one. No gonococci found in eye secretion or in the mother's lochia. Third day discharge greatly diminished. Continued the same treatment, except the nitrate of silver gr. x-3j. Fifth day no discharge. Continued treatment. Eighth day the child died with bronchopneumonia.
14	T. K., aged 12 days. Few days after birth both eyes affected. Mother had 8 children, none of them had sore eyes except the last one. Could not get any further history on account of mother not able to speak English.	Eyes swollen, ocular conjunctiva injected. Discharge of pus. Both corneae clear.	Treatment same as above. Second day discharge greatly diminished. Fourth day no discharge. Continued the same treatment. Twelfth day both corneae clear.

TREATMENT.

We all know that the chief thing is to keep the eyes constantly clean, with a non-irritating solution, but it is very important to show the mother of the child, or nurse, how to clean the eyes,—if they do not know how, they leave pus behind and injure the cornea in their attempt to clean it. The use of the ice cloth should also be taught, and it should be applied constantly, unless an ulcer is formed on the eye. Atropine should be used when the cornea becomes steamy or a central ulcer forms. Eserine should be used only when a peripheral ulcer is formed on the cornea.

Nitrate of silver, gr. x to 3j, neutralized with the salt solution, should be used twice a day by the physician, and never should be entrusted to the nurse or mother. Its strength should be gradually diminished, and its application not be stopped for about a week after all discharge has ceased.

TREATMENT OF CERTAIN CORNEAL LESIONS BY HYDRAULIC CURETTING WITH SUBLIMATE SOLUTIONS.¹

BY THOMAS H. PLEASANTS, M.D., HELENA, MONTANA.

IN RESPONSE to a kind invitation from the Secretary of this Association, to prepare and read a paper upon some appropriate subject, and appreciating the fact that each one of us, perhaps, at some time during our professional career, has had a case of corneal ulcer or abscess, which has persistently resisted every effort on our part to bring about a condition of satisfactory resolution, and where every remedy applied only seemed to add fuel to the fire, I have thought that it might not be wholly without interest to report my experience in the treatment of these cases, by a method the description and technique of which, I will attempt to set forth in the following pages of this article.

I know of no subject which is so full of interest, both to the physician and the patient, as the subject of corneal lesions and their proper and improper treatment. It seems to the patient on the one hand, a life of happiness and usefulness; on the other, a life of woe and despair. To the physician, on the one hand, the proud consciousness of having given to his patient the benefit of a treatment which results in preserving his sight to him, the dearest thing on earth, and on the other, the everlasting reproach of conscience for not applying a certain treatment, if such is known to possess a specific virtue in excess of any other known treatment, thereby entailing upon this patient, a life of untold distress, which, under certain conditions and circumstances is intensified many times over.

If a physician knows of a remedy that will bring about better conditions than those remedies which have heretofore been used in the treatment of corneal lesions, and with results anything but always satisfactory and uniform, then it becomes his solemn duty to suffering humanity to herald to the world

¹ Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

that remedy, no matter what it may be, or however indifferently he may convey his knowledge of the remedy to others, so long as it can be demonstrated to be a decided benefit and improvement over other already known methods of treatment. Since the first case upon which I used the method of treatment under consideration, I have yet to record a single failure to discharge a patient with other than good and useful vision, but I hope I will not be misunderstood in making this statement, to claim that any and every case will be restored to perfect vision, no matter how extensive the ulcer, or how large the abscess. I can never cease to regret the fact that I was unfamiliar with "hydraulic curetting," when, three years ago, a patient with an infected trachomatous ulcer of the right eye applied to me for relief. After making a thorough examination of the case, I was satisfied that I had a serious trouble to deal with and one which held out little hope for the welfare of my patient's sight in that eye. I used faithfully and in rotation, every known remedy which had ever been advocated, except the one remedy which forms the subject of this article. Result: Total loss of sight in the eye with a dense leucoma and anterior synechia. I felt lucky in not having to remove the globe for panophthalmitis.

During the past eighteen months, I have been called upon to treat many cases of corneal lesions with results so eminently satisfactory, both to myself and to the patients, that I feel constrained to report at least three of the cases which were treated by hydraulic curetting with sublimate solutions. In the September number, 1895, of *Annales d'Oculistique*, page 198, is an article entitled "Hydraulic Curetting of the Cornea," contributed by Dr. Santarnecchi, of Cairo. In this article, the author goes on to say that out of every one hundred cases of ocular diseases in and about Cairo, about seventy cases have some form of corneal lesion, and frequently a very severe type, and he describes briefly the different methods of treatment as applied to corneal ulcers and abscesses, which have been in vogue at different periods. He discusses keratotomy as proposed by Saemisch, its advantages and disadvantages. The actual cautery, which, in the general enthusiasm attendant upon its use, supplanted Saemisch's keratotomy for a time, but which is being relegated to oblivion, owing to its disastrous effects when the ulcer is at all large, because it so often de-

stroys the healthy as well as the diseased tissue, and leaves behind an indelible stigma. "Another method then," he goes on to say, "is necessary which will be less disturbing and less dangerous for the patient," and which, quoting Dr. de Wecker, "will substitute for an ulcer, the walls of which are infected and invaded with micro-organisms, a wound in healthy corneal tissue, which an occlusive and aseptic dressing will guarantee against new infection. Such a result may be expected with greatest confidence from curetting; but Dr. de Wecker himself states that curetting alone is not sufficient, and that it should be followed by energetic irrigation to remove the portions of infected tissue which the most careful curetting will not carry away." Dr. Santarnecchi then goes on to describe what he calls *hydraulic curetting*. He uses a syringe holding, say, one ounce, and fitted to the syringe is a fine nozzle, which I should judge is of about the same calibre as that of an average size hypodermic needle. The syringe is filled with a one to one thousand sublimate solution. After first instilling several drops of a one per cent. solution of cocaine into the eye, and waiting a sufficient time for its anæsthetic effect, he separates the lids as widely as possible, and, directing the jet of sublimate solution against the ulcer or wall of the abscess, gradually increases the force of the stream until the last portion of adherent ulcerated tissue is removed. He takes the precaution to instill a few drops of atropine solution in suspicious cases—that is, where he has reason to believe that the iris is involved, or in those cases where the opacity of the cornea is so great as to render it difficult for the surgeon to ascertain the exact condition of the iris. Bearing in mind the case of infected ulcer of the cornea which I have mentioned, and the destruction of sight which followed, I determined to use this method of treatment—namely, *hydraulic curetting*, on the next case that presented itself, which seemed a suitable one for the treatment.

On December 1, 1895, T. M. sent for me to see him at the "Sisters' Hospital" of this city. On examination I found that his left eye had been destroyed from injuries, which he stated, were received during the Civil War. His right eye was constantly congested, and exceedingly painful. In the inner and lower quadrant of the cornea was a large ulcer, which was bulging and the anterior chamber contained pus,—about one large drop. The pupil was very small and photophobia exces-

sive. His history was about as follows: A sheep herder by occupation; about 60 years of age, and of intemperate habits. About two weeks prior to the time I first saw him, he was attending to his duties—herding a band of sheep, when there came a wind storm. Dust or some other foreign body entered his eye. That night he suffered great pain, and it increased the following day. It became so severe that he went to White Sulphur Springs for the purpose of getting something to relieve him. He was given some sort of powder, as he says, to have blown into the eye. Not experiencing any relief from this remedy, he came to Helena. He saw a physician here who gave him some eye lotion to use as directed. He still suffered pain, but continued to use the treatment for a week or ten days. At the end of that time he was persuaded to have me see him and prescribe for him. I saw him, just as stated, and found his condition as described above. His was a case where injudicious treatment meant total blindness. I must confess that I felt like turning the case over to some one else, because I was almost certain that he would lose his sight, but I went to work to improvise a syringe, and fitted a hypodermic needle in it so that the stream would be small, and with this instrument, filled with a one to one thousand solution of bichloride of mercury, I succeeded in thoroughly cleansing the surface of the ulcer from all dead tissue. There were moments when I was in dread of breaking through the thin membrane with this stream, but I did not, fortunately, and after instilling a few drops of four grain atropine solution, I closed the eye, and sealed it with an antiseptic dressing. Ordinarily, we would expect to find, on examination of the next day, very considerable reaction from the irritation of a 1 to 1000 bichloride solution. As a matter of fact, however, there was very little. The conjunctiva was slightly puffed, and the patient stated that he had suffered very little pain following the operation. There was a very marked general improvement in the eye and the condition was so much better than I had any hope of finding it, that I was quite delighted, but was almost afraid as yet, to put much faith in the treatment. However, I repeated the operation of the day before in every detail, and on the third day I noticed that the hypopyon had diminished one-half, and the pain in the eye had entirely disappeared. Now it was that I began to have hope. On this third day of treatment, instead

of using the sublimate solution, I used a saturated solution of boric acid. I did so more because Dr. Santarnecchi advised doing so, than for any other reason, but on the fourth day, no ground having been lost, I again used the sublimate solution, but this time it was a reduced strength, 1 to 1500. On the fifth day the hypopyon had disappeared entirely and I noticed numerous minute bloodvessels creeping towards the surface of the ulcer—the repair bloodvessels. From this time on the recovery was uneventful and rapid. The cornea cleared up, the engorged bloodvessels of the conjunctiva began to be emptied out, and a general clearing up of all the tissues of the eye took place. At the end of twelve days I discharged the patient with vision $\frac{20}{21}$. I will state that this man had had, on several occasions (the last one previous to this, three years ago), attacks of inflammation in his eye, and I discovered that it was a plastic iritis, which left the iris adherent to the lens in several places. He denied strenuously ever having had syphilis.

The second case is somewhat different from the foregoing, but the treatment was just the same. D. M., aged 42 years, applied to me on February 28, 1896, for treatment. He is a miner by occupation and stated that three or four days before coming to see me, he had been struck in the eye with a piece of quartz or steel, he could not say which; that he did not pay much attention to it at first, but his eye gradually commenced to hurt him and it finally became so painful that he had to give up work and seek relief. Upon examination, I found in the center of the cornea of the left eye a grayish looking ulcer, and surrounding it in every direction was a milky infiltration between the layers of the corneal tissue. He was suffering greatly and was unable to open his eye without feeling great distress, and his vision was reduced to less than $\frac{20}{60}$. I was satisfied that I had on my hands the beginning of a case of corneal abscess. I instilled a few drops of cocaine solution, four per cent., and then proceeded to apply the hydraulic curetting, using in the syringe a 1 to 1000 sublimate solution. The corneal tissue at the point where the injury was received was soft and pulpy. I succeeded in removing all of the soft dead tissue and applied an antiseptic dressing and bandage on the eye, telling him to return on the following morning. What was my surprise and delight to find that the milky appearance of the cornea had almost entirely disappeared, and that the sight was so much

improved that he could distinguish at twenty feet letters in the second line of test type, and that he practically had no pain at all. The treatment was repeated twice more, under strict antiseptic precautions, and to make a short story still shorter, on the fifth day he was discharged from my care with but the faintest opacity. I saw this patient a month later and the opacity had entirely disappeared.

On October 7, 1896, Christian H., a machinist, came to my office in a state of great physical suffering and also mental distress. He said that while at work in the shop the day before, a particle of steel or iron had been thrown against the left eye with great violence, but that after suffering a slight momentary twinge of pain, he went to work until it was time to quit, being then nearly 6 o'clock. When he reached his home, however, the pain returned, and in spite of soothing applications of first one kind, then another, it continued to grow rapidly worse, and he spent the night mostly in walking the floor, and when morning came, he was at my office bright and early. Before describing his injury, received the day before, and for which he sought my services, I will state that two weeks previous he received an injury, almost identical in every detail, only it was in the right eye. He received attention from another physician in the city, who gave him the usual routine treatment, but the wound evidently became infected, for his sufferings were excessive and his cornea, surrounding the point of injury, which was in the center of the pupillary area, was so very much infiltrated and hazy, that he was unable to see any letter on the card of test type, even the outline was totally invisible. The pain had been continuous, and was still present when I examined him. At the exact spot where the foreign body struck the cornea, there was still an open ulcer, which was small, about the size of a millet-seed, but which was covered with a soft, pulpy deposit. My reason for describing the first injury will become known presently, because I desire to use it in drawing a comparison on the results of different treatments used in the two eyes. Now for the injury to the pupillary area of cornea of the left eye. Upon examination, after first making two or three instillations of a four per cent. solution of cocaine into the conjunctival sac, for the pain and photophobia were very great, I found lodged in the center of the cornea, a black speck, which proved to be firmly implanted when I at-

tempted to remove it, and after removal, I made a more critical examination of it and found it to be a speck of iron, and the corneal tissue underneath where it had lodged was found to be burned, showing that the speck of iron was very hot when it struck the eye. With a spud I removed as much of the burned tissue as I dared to, and I then proceeded to use the bichloride of mercury solution, directing the stream with very considerable force against the portion of cornea which was affected by the foreign body, until I was satisfied that I had removed every possible source of infection. I then introduced a few drops of a two-grain solution of atropine and a four-grain solution of cocaine, each of which was dissolved together in a saturated solution of boric acid once more. There was for a few minutes a very sharp pain following the use of the bichloride solution, but it subsided entirely inside of a half hour. I then repeated the operation of "hydraulic curetting" on the right eye, using the bichloride solution as I had just done in the left eye; I kept it up until I had thoroughly cleansed the surface of the ulcer, already described, and after using atropine in this eye also, because there was very sharp pain in the ciliary region below, when I made moderate pressure upon the globe. I bandaged both eyes, after first rendering the region around the eyes, as well as the inside, perfectly aseptic, and took him home. I saw him next day. He passed a painless day and night, sleeping a great part of the time, and when I removed the dressings I found everything as perfectly satisfactory as one could reasonably wish. I re-applied the dressings as on the day before, only using a little hot boric acid solution outside and the atropia and cocaine solution inside. The next day, upon visiting him, he stated that there had still been no pain whatever, and that he could not see why I should keep him shut up in the house when he had so much work on hand that ought to be done. After a little persuasive eloquence, I managed to get him to look at the matter in its proper light and remain quiet at home until I was satisfied it was safe for him to go out. There being a little soft grayish tissue still left on each eye at the point of injury, for safety, I used a 1 to 3000 solution in the syringe, applied as usual, and dressed as on previous day. This was all that I did in the way of curetting. His vision to-day is $\frac{20}{xx}$ in each eye.

In reporting the three cases, I have selected them from

the whole number treated, as fairly representative of the several classes of corneal injuries, to which I have applied this treatment, and I have tried to keep within bounds and not prolong their recital unduly, at the same time give a fairly lucid description of the cases and their progress under treatment. I desire particularly to disclaim any credit for originality in the matter of treatment, because to Dr. Santarnecchi, of Cairo, alone is the honor to be ascribed. I am only a humble disciple, but I do desire to proclaim to the world in stentorian tones, the fact, that, so far as my experience, covering a period of over eighteen months, in the application of this method of treatment is concerned, *no remedy*, nor the *method of applying any remedy*, for the treatment of corneal lesions has ever been advocated, in my opinion, that can *begin* to show the percentage of perfect results as the "treatment of certain corneal lesions with sublimate solutions" can show, and I will feel particularly gratified if the profession at large will use it oftener, instead of prescribing a bottle of eye lotion, and let the patient take his chances on the general result, as has so often been done, to the detriment of the patient's sight.

SYPHILITIC AMBLYOPIA.¹

BY ROBERT F. LE MOND, A.M., M.D., DENVER, COL.,

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THE title of this paper is not a familiar one from the fact, possibly, that there is not sufficient clinical evidence to warrant a separate and distinctive designation. Yet we know that such a thing does exist though, like many other troubles, for instance, exostosis of the orbit and vitreous cysticercus, it is met with very rarely. I have looked up the literature of amblyopia pretty thoroughly and have concluded that syphilitic amblyopia is entitled to a place in our text-books, along

¹ Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

with the congenital, alcoholic, hysterical and other varieties. I hope that, after I get through reporting a case which I treated in 1895, the members of this distinguished body will readily agree with me that my subject is not a misnomer.

A gentleman, Mr. J., came to me in November, 1895. His age was 58, his occupation that of a railroad engineer. He was a strong, robust man, 5 feet, 8 inches tall, weighing 175 pounds, and full of life and vigor. He told me that seventeen years ago his vision began to fail gradually day by day, until he was forced to give up his position; and, at this time, he had to have an attendant with him to see that he did not stray into by-ways, off of the sidewalk, and in the way of cars, vehicles, etc.

On examination I found the field of vision considerably contracted in both eyes, especially on the temporal side. He still had sufficient sight to distinguish doors and windows without trouble. His vision was: O. D., V. = $\frac{2}{\infty}$; O. S., V. = $\frac{1}{\infty}$. Color perception was very much impaired for both green and red, and blue could not be told from black. The ophthalmoscopic findings were nearly negative. The retina was of a pale, dim, lifeless hue, as if viewed through a veil. The fovea centralis could hardly be discerned. The retinal bloodvessels were extremely contracted. The vitreous appeared clear and quite free from coloring matter of any kind. The lens looked a little dull on the posterior surface, but otherwise normal, as was also the cornea. The iris reacted to light, but very poorly.

I inquired particularly as to a syphilitic history. The patient could give but little information on this point. He said he had possibly been a little wild in his youth, and about the time that he was grown he had quite an eruption appear over his body; but he was treated for it by a good physician and it soon disappeared. He told me that he had been treated at different times by several different oculists, but without benefit, and he had concluded to seek relief in New York or Boston; but decided to give the West one more chance, and so came to me. I told him I would treat him two weeks, at the end of which time, if I found him getting no better, I would not hesitate to tell him so; and that I thought the outlook was anything but encouraging.

I suspected that his trouble was of syphilitic origin and put him at once on the following treatment :

- (1) R Potass. iodidi, - - - ʒiij.
Hydrarg. corrosiv., - - - gr.j.
Aquæ dest. - - - ʒiij.

M. Sig.—ʒj t. i. d.

- (2) R Strychniæ sulph., - - - gr.¹/₃₀.
(Triturates) No. xxx.

Sig.—One tab. t. i. d.

In addition to this I used the positive galvanic pole of eight cells five minutes in each eye, once a day. I continued to increase the iodide until he was taking 150 grains a day, and also the bichloride up to three-twentieths of a grain a day; and the strychnia I increased to three-twentieths of a grain a day. At the end of two weeks he was so much improved under this course of treatment that he did not any longer need an attendant. At the end of two and one-half months his vision had risen to ²⁰/_{xvi}, and my assistant began to give him a daily lesson in the alphabet, as he had forgotten his letters. We continued thus for six weeks longer, by which time the patient could see sufficiently well to easily recognize ordinary newspaper print, with his error of refraction corrected, which was a + 5.00 D. s. After wearing these glasses for some two weeks with no apparent difficulty whatever, and his vision holding up quite well, I then dismissed him.

This being such a rare and interesting case, in my opinion, I thought that possibly it would prove to be so to the other members of my profession; and, when I received a letter from the Secretary of this distinguished body several months ago, requesting me to read a paper on this occasion, I could not think of anything that I could produce that would be more interesting than the above case which I decided to call syphilitic amblyopia.

SOME OF THE PHYSIOLOGICAL FACTORS CONTRIBUTING TOWARDS MAKING THE EYE EMMETROPIC.¹

BY E. S. HEISIG, M.D., HOUSTON, TEXAS.

THE subject that I wish to present to your attention to-day is, "Some of the Physiological Factors Contributing Towards Making the Eye Emmetropic, and What the Exaggeration or Insufficiency of Such Physiological Action Results in, or Excessive or Insufficient Physiological Action Regarded as a Probable Frequent Cause of Ametropia."

You will please take especial notice that I say "probable frequent cause." I do this purposely as what I shall endeavor to present to you I can hardly consider as absolutely proven. The main facts from which my deductions are drawn, are, of course, taken from various sources, the statement of these facts being made in connection with different subjects pertaining to the eye, often in quite an incidental way. My part has been to gather these facts together, and to show the relation existing between them, thus aiding, I hope, toward building a complete structure out of parts which until now, according to the best of my information, have remained isolated facts. It is this relation then of the various facts and the resulting theory that can only be here called in question as it is these alone for which I claim to be mentally responsible.

My taking a subject that is usually considered as belonging to one of the great specialties, I trust, needs no apology. If, however, one is needed, I find it is the very fact, that being no specialist I could hardly presume to offer this paper to a body whose members had made a special study of this organ, and who would therefore be calculated to have given this subject more thought than I have. As I could hardly then presume to treat of this subject before a body of oculists, I must either keep my ideas to myself or present them to physicians in general. So that the only further excuse necessary at all is to justify a general practitioner treating of a special subject. I suppose a sufficient excuse might be "that this is a

¹Read by title before the South Texas Medical Association

free country," but a better one is to be found in the indisputable fact, that the general practitioner is forced to make all specialties his, and to be prepared to deal with any of its subjects.

With these preliminary remarks, I shall, as briefly as possible, state my theory and reasons for the same. To the laity, and probably to some few physicians who may not have given the subject much thought, it may seem "perfectly natural," to use a common expression, perfectly simple, to be more accurate, for the great majority of eyes to perform their function perfectly, or at least practically so. This however to all who are conversant with the details of the mechanism of vision, to say nothing of the psychical element, is not so self-evident. And the more one understands of the subject, the more amazed one is to find such perfect adaptability and construction of the organ in question. Leaving out in this place the part which the nervous system plays, we shall confine ourselves to the comparatively simpler mechanism of the eyeball viewed as a camera.

We know that the ideal eye is so constructed that when the organ is at rest, *i. e.*, when its accommodation is not brought into action, parallel rays of light will be accurately focused on the retina, or to be more explicit, on the fovea centralis. The eye is then said to be emmetropic. When this is not the case, the eye is said to be ametropic, and may be either hyperopic, myopic, or astigmatic. Not to go into minute details it suffices to observe that one of the essential requirements of the emmetropic eye is, that the refractive power of the eye sustain the proper relation to the length of the axis, *i. e.*, the antero-posterior diameter of the eyeball, any disproportion between the two, such as the axis of the globe being the slightest fraction of an inch either too long or too short in proportion to the refractive power, or *vice versa*, causing ametropia.

How this state of the perfect adaptability of the refractive media to the antero-posterior diameter of the globe is brought about is, I believe, the key to the solution of the problem as to the chief causes of ametropia, and especially to that form in which the axis of the eye is too long in its relation to the refractive media.

To pursue this investigation we will first try to ascertain

the refractive condition of the eye at birth as compared with that found at a later period. Noyes intimates that great discrepancies exist in regard to this between different authorities and adds that, "The only results which can be considered trustworthy are those obtained under full paralysis by a mydriatic." He then quotes Hansen, who examined 805 children between the ages of 10 and 15 years, in whom this requirement was met by the use of one per cent. hydrobromate of homatropine solution. I take the liberty of copying the same.

AGE.	NUMBER.	AVERAGE H.	PER CENT. H.
14	134	75 D.	88
13	130	1.00 D.	92 3
12	170	1.25 D.	93.5
11	160	1.50 D.	93 1
10	211	1.75 D.	97.6

The result was, that in 94.4 per cent. there was hyperopia. If we assume this to be practically correct for the ages given, and bear in mind that of those children whose ages were 14, only 88 per cent. were H., while of those 10 years of age 97.6 per cent., or nearly all, were in this condition, we are forced to the conclusion that hyperopia must be the refractive state of the eye at birth in nearly all cases. Hyperopia then must be the rule and enmetropia and myopia the rare exception.

Nettleship says in his work on "Diseases of the Eye" (third American edition, page 329): Hyperopia always dates from birth and does not afterwards increase, except slightly, in old age. But it may diminish and even give place to myopia by elongation of the eye." Dr. Hansen's statistics go to prove that hyperopia *may* not only diminish but that this is the rule as the older the children the less the average degree of hyperopia. That the per cent. of hypermetropes was found less as the ages increased also shows that some must have gotten completely over their hyperopia.

Again, Nettleship says in the same work above referred to (page 324): "Myopia is very rarely present at birth, the elongation of the globe which constitutes myopia comes on gradually during the growing period of life, and especially between the ages of 10 and 20; the eye begins to elongate during childhood. He adds in a foot note on the same page that: "Recent examinations by Schleich and Hermann upon several hundred infants show that the human eye is almost invariably

hyperopic at birth." That the eye is usually hyperopic at birth and becomes less so, or emmetropic at a later period is also supported by the anatomical fact that at birth the eyeball is almost completely spherical while at a later period the antero-posterior diameter exceeds the others by nearly a mm.

Thus Baker in the "System of Diseases of the Eye," edited by Drs. Norris and Oliver, says: "The diameters then (meaning at birth) are approximately equal, the spherical form being more nearly realized, and the child is usually hyperopic." While Noyes in his work gives the following dimensions in the adult as compiled from the highest authorities:

Antero-posterior diameter		24.3 mm.
Transverse	"	23.6 "
Vertical	"	23.4 "

Which makes the antero-posterior exceed the transverse by 0.7 mm. and the vertical by 0.9 mm. I also quote the following from Fuchs' "Text-Book of Ophthalmology," p. 646: "The shortness of the eyeball, which is the cause of hyperopia, is congenital. Almost all new-born children are hyperopic, their eyes being originally constructed too short in proportion to the refractive power of the media. As the child grows the eyeballs elongate in proportion so that they acquire their requisite axial length and become emmetropic, indeed the elongation may even shoot beyond the mark and pass into myopia. On the other hand, the elongation of the eye may fail to take place to a sufficient degree, so that a certain amount of hyperopia remains during the whole of life."

Now it would not only be interesting, but also instructive, to ascertain the refractive state at a later period of life, say 30 years of age. I find this impossible, however, as I have been unable to find statistics giving the per cent. of persons at this period of life who are emmetropic or otherwise, except that I find that it is estimated that in Germany about 8 per cent. of the entire population are myopic. However, in what has already been said, this has been indirectly anticipated, so that I believe we are justified in assuming that the hyperopia of infancy is in the vast majority of cases only a transient condition—a stage of development in fact, if I may be permitted to use the expression. And this is recognized by the authorities I have already referred to.

Now how is the state of emmetropia brought about?

The correction of hyperopia can be brought about in two ways—either by increasing the refractive power of the eye when in a state of rest, or by permanently lengthening the axis of the globe. Constant (by virtue of spasm) or at least excessive contraction of both the intrinsic muscle, and the extrinsic muscles of the eye, I believe, is amply sufficient to bring this about, the action of the former, perhaps, tending to permanently increase the refractive strength, while the action of the latter, aided by that of the former, is certainly capable of bringing about a permanent increase of the length of the antero-posterior axis of the eye. To explain the *modus operandi* of how an increase of refractive power with the accommodation at rest may be brought about, we might assume a permanent increase in the convexity of the crystalline lens by the constant action of the ciliary muscle whose action as we know normally is to bring about only a temporary increase. It is certainly possible—nay, not only possible, but of everyday occurrence, that an organ held in any position, or in any shape, for a great length of time, retains the position or shape, more or less even after the forces that held it in such position or shape, have been removed. We further know, that the excessive use of a muscle tends towards its hypertrophy, and as in hyperopia the ciliary muscle must be excessively, and almost constantly, used, we should expect to find it hypertrophied, and this competent observers have verified. For instance, Noyes says: "Hyperopia necessitates an effort of accommodation proportionate to its degree, and the result is, that if great, the ciliary muscle becomes enlarged, and in adults its size and contour have a well-marked and conspicuous character. This has been exhibited by Ivanoff." This hypertrophy, it seems to me, should easily enable it in most cases to do its part to further release the crystalline lens so as to enable it to become still more convex in the further effort of accommodation. It may also be possible that as a result of the ciliary muscles being practically in a constant state of contraction this position of the ciliary muscles is permanently acquired irrespective of its contracting properties, so that this position finally becomes the normal one in a state of accommodative rest. Another way in which it is possible, that the refractive power of the eye while at rest may be enhanced, is by an increase of the refractive index of the media, especially

that of the crystalline lens by an increased density or otherwise. But whether this or an increased convexity of the lens as above described really often, or ever, takes place, is merely a matter of conjecture although worthy of further investigation. The other way by which a hyperopic eye may become emmetropic, or even go on to myopia, for that matter, is by a relative increase taking place in the length of the axis of the globe. And this is certainly what essentially takes place, particularly in those cases that go on to myopia.

I may state here that this paper practically only takes into consideration axial ametropia, discarding astigmatism and ametropia due to other causes. It must also be borne in mind that the process of elongation here referred to is not normally a stretching, but a physiological development, simple stretching probably always being pathological.

Let us now consider in what way this is most probably brought about. First, by the action of the ciliary muscle and especially by the circular fibers of the same which when brought into excessive and comparatively constant action tend to constrict the circumference of the eye on a plane anterior and parallel to the equator with, of necessity, a corresponding elongation of its antero-posterior diameter. This constriction being prolonged, and comparatively constant, and absolutely so in the case of accommodative spasm, the organ may be thus altered in shape permanently, particularly when aided by the action of the extrinsic muscles, as we shall presently endeavor to show.

Moreover, the action of the ciliary muscle has a stretching effect on the tunics of the eyeball, partly because the globe of the eye being spherical any alteration in its shape making it less like a sphere, lessens its capacity and assuming that the contents remain the same, the area of the tunics must be increased. This action may be said to be indirect, and due, as stated, to the alteration in shape of the organ. In addition to this and probably even more effective in the stretching process are the longitudinal fibers aided by the oblique which draw the coats of the eye directly forward over the contained vitreous.

The extrinsic muscles aid the action of the ciliary muscle in that they too compress the equatorial region of the eye. This is easily understood in regard to the obliques which virtually surround the eye in this region. The recti also compress

the globe by virtue of the fact that both their origins and insertions are limited to a space whose area is less than that of a section of the eyeball made through and parallel with its equator. This being the case the muscles can not take a straight course as their names would indicate, but must curve around the eyeball, for they are inserted anterior to the equator, and upon contracting and straightening bring about a compression of the region between this insertion and the equator.

Now, in the emmetropic condition, when the eye is engaged with distant vision, these muscles are not actively brought into play, because directing the eyes from one distant object to another involves but a small change in the direction of the axis of the eyes which at the same time remain parallel. The acting muscles are also not at the same time antagonized by those of the opposite kind except sufficient to steady the eye, but in hyperopia this is different. An amount of accommodation proportionate to the degree of hyperopia will be necessary for distinct distant vision, and with this there will be a corresponding effort of convergence brought about chiefly by the action of the internal recti, aided by the inferior and superior recti. But as just remarked the axes of the eyes must remain approximately parallel, so that this involuntary effort at convergence must be counteracted, and this is done by a corresponding contraction of the external recti, aided by the obliqui. It will be readily seen then that the chief difference of the action of these muscles on the globe of an emmetropic eye and on that of a hyperopic eye is, that in the emmetropic eye the action is intermittent, and only acted on by one set of muscles, the opposite set only acting sufficiently to steady the eye, hence there being no resistance the eye moves in the required direction instead of being compressed to any extent. In the hyperopic eye, on the other hand, the action is constant whenever vision is exercised, and not only that but the involuntary effort of convergence must be overcome, so that both sets of muscles are acting at the same time, and in opposite directions constituting the most favorable conditions for exercising compression. I may state here by way of parenthesis, that I am strongly impressed with the idea that the whole result of accommodation is probably not effected by the crystalline lens by increased curvature, etc., but that probably at least in some instances a temporary elongation of the eye as

described accompanied perhaps by increased curvature of cornea, etc., helps in the accommodation process. This finds strong confirmation in the case reported by Herbert Harlan, M.D., in the *Journal of the American Medical Association* of November 28, 1896, in which, after the removal of the lens, accommodation to the amount of 2 D. still remained.

[TO BE CONCLUDED IN NOVEMBER NUMBER]

THE OPHTHALMOMETER AS A GUIDE IN SUBJECTIVE OPTOMETRY.

BY GEORGE J. BULL, M.D., PARIS.

IN ALL cases of refractive error it is incumbent on the ophthalmologist to examine for astigmatism and to determine its extent when present; for, in the first place, he can not measure the exact degree of myopia or hypermetropia unless he also measures the astigmatism; and, in the second place, the astigmatism may be the cause of certain symptoms relievable by the use of correcting cylinders.

It is usual to consider the dioptric system of the eye as composed of only three refracting surfaces, the anterior surface of the cornea and the two surfaces of the crystalline lens. Recent researches,¹ however, have shown that a fourth surface, namely the posterior surface of the cornea, has also some importance; for the index of refraction of the cornea differs from that of the aqueous humor more than was formerly supposed. This difference is shown by the fact that the image of a lamp-flame reflected by the posterior surface of the cornea is sufficiently bright to be distinctly visible.

In the present paper, however, I shall use the term "corneal" astigmatism only in speaking of the astigmatism of the anterior surface of the cornea, measurable by the ophthalmometer, and I shall include under the term "intra-ocular" astigmatism that of the three other refracting surfaces,—the posterior surface of

¹Tscherning — "L'influence de la surface posterieure de la cornée sur la réfraction oculaire," Bulletin Soc. Francaise, Vol. X, p. 328.

the cornea and the anterior and posterior surfaces of the crystalline lens.

Astigmatism of the whole eye—total astigmatism as it is called—is the resultant of the special astigmatism of all four refracting surfaces, or, in other words, is the resultant of corneal astigmatism and intra-ocular astigmatism.

To determine the amount of the intra-ocular astigmatism, we have recourse to such instruments as Tscherning's ophthalmophacometer. In the year 1891 Tscherning examined my right eye with his instrument and found:

In the anterior surface of the cornea, an inverse astigmatism of	0.74 D.
In the posterior surface of the cornea an inverse astigmatism of	0.57 D.
In the anterior surface of the crystalline a direct astigmatism of	1.09 D.
In the posterior surface of the crystalline an inverse astigmatism of	0.95 D.

Taking into account the refractive direction of the principal meridians of the four refracting surfaces he has found the resultant of the four values to be a total inverse astigmatism of 1.05 D. Tscherning has examined a few other eyes (one of which differed from mine in showing 2.36 D. of direct astigmatism in the anterior surface of the cornea), and has found in all of them that the crystalline and the posterior surface of the cornea produced together an inverse astigmatism.

My own experience leads me to believe that this is the general rule; for the comparison of the amount of the corneal astigmatism with that of the total astigmatism in a large number of cases shows that the difference may be roughly expressed as being equal to an inverse astigmatism of about 0.75 D.

Again, if it be true that the total astigmatism of the eye is the resultant of an intra-ocular inverse astigmatism and of the corneal astigmatism, we should expect that the meridian of greatest refraction of the whole eye would not always coincide with the meridian of greatest corneal curvature. My experience justifies this inference.

Moreover, as the addition of two convex cylinders of equal value with a certain angle between their axes produces a combination having its meridian of greatest refraction per-

pendicular to the bisector of the angle, we should infer that an analogous effect would occur in the eye as the resultant of an intra-ocular inverse astigmatism and a direct or oblique corneal astigmatism, and that if the corneal astigmatism be of low degree, the meridian of greatest refraction of the eye will incline more towards the horizontal than does the most curved meridian of the cornea. Experience has shown me that this is commonly the case. It has also shown, as might be inferred from the experiment of adding a strong convex cylindrical glass to a weak one at another axis, that when the corneal astigmatism is high the meridian of greatest refraction of the eye commonly coincided with the meridian of greatest corneal curvature.

The instruments and the calculations required to determine directly the degree of intra-ocular astigmatism are at present too complicated to allow of their general use in the consulting room. The corneal astigmatism can, however, now be measured with quickness and accuracy—thanks to the ophthalmometer of Javal and Schiötz; and the purpose of the present paper is to consider how far the inferences to be drawn from a knowledge of the corneal astigmatism are of value in everyday practice.

It is true that the measurements obtained by the ophthalmometer give us figures very different from the total error we are required to correct. I have found, however, that there are a few simple rules by the application of which the measurements of the ophthalmometer may be made to furnish a most useful guide. These rules are the natural sequence of the general considerations as to intra-ocular errors to which I have just alluded.

Speaking broadly, it may be said that the total astigmatism is approximately equal to the amount indicated by the ophthalmometer, expressed as myopic astigmatism, combined with an inverse myopic astigmatism of 0.75 D. From this, and from the considerations already mentioned, it follows that:

1. When the corneal astigmatism is direct, and above 1 D. we may expect the total astigmatism to be also direct but of lesser amount.
2. When the corneal astigmatism is direct and about 0.75 D. we may expect to find almost total absence of astigmatism by subjective examination.
3. When the astigmatism is direct and 0.25 D. subjective

examination will probably reveal an inverse astigmatism of about 0.50 D.

4. When there is no corneal astigmatism we may expect to find by subjective examination an inverse astigmatism of about 0.75 D.

5. When the corneal astigmatism is inverse, we shall generally find by subjective examination a higher amount of inverse astigmatism.

6. When the corneal astigmatism is oblique and direct rather than inverse, a lesser degree of astigmatism will be discovered by subjective examination. The reverse of this is true when the obliquity tends to bring the case into the class of inverse astigmatism.

7. When the corneal astigmatism is oblique and of low degree, the meridian of greatest refraction of the whole eye commonly inclines more towards the horizontal than does the meridian of greatest corneal curvature.

8. When the corneal astigmatism is of high degree, the meridian of greatest corneal curvature coincides with the meridian of greatest refraction of the eye.

The above deductions are of course given only as approximations to the truth. The ophthalmometer should never be considered as a substitute for the subjective method of examination. It should be looked upon as a guide and as a check, enabling us to conduct the subjective examination on logical principles.

The first glance at the images of the "mires" of the instrument as we rotate the arc, shows whether there is any corneal astigmatism. The difference of the level of the "mires," or their overlapping, enables us to estimate the amount of error. We see immediately whether the astigmatism is regular or irregular; for when the images of the "mires" are of normal shape and of equal size, and when the principal meridians are perpendicular to each other, we conclude that the astigmatism is regular. When, on the contrary, the images are deformed or when one is smaller than the other, we know that the astigmatism is irregular.

The information given by the ophthalmometer is often more trustworthy and useful than that given by skiascopy or any other objective method of examination, and it is needless to add that the cornea may be measured by the ophthalmo-

meter in cases in which opacities in the media render skiascopy quite impossible. When the corneal astigmatism is irregular, the ophthalmometer often enables us to judge of the expediency of endeavoring to correct the error by cylindrical glasses. In this communication, however, I shall not touch upon the services which the ophthalmometer has rendered, and will still continue to render, in the study of the changes in corneal curvature which occur after wounds of the eye, and during the progress of keratoconus, pterygium, etc. I will confine myself here to the practical value of the instrument in cases of regular astigmatism.

It is a great advantage to know beforehand the amount of astigmatism that we may expect to find. The rules already stated enable us to infer in many cases that the total astigmatism does not exceed 0.25 or 0.50 D. Such an inference is often of value. For example, when we consider it in connection with the visual acuity of the patient and with the circumstances and symptoms of his case, we may judge whether it be expedient to determine the exact amount of astigmatism by the subjective method. Again, if we are seeking the cause of the bad visual acuity it informs us that astigmatism may be excluded, and thus we are helped to find the real cause. It is hardly necessary to add that it saves us from a wearisome and fruitless search with cylindrical lenses.

When, on the other hand, the ophthalmometer shows that we have to deal with a high degree of astigmatism, we properly dispense with trials with the weaker cylinders, and in this way gain time, spare the patient fatigue, and greatly simplify the problem which his answers help us to solve. Much might be said on the value of the instrument as a time-saver; but I prefer to call your attention to an advantage which has not to my knowledge been referred to by other writers.

This advantage is that the ophthalmometer enables us to proceed in the different parts of the subjective examination with logical precision and certainty, not so much by indicating the amount of astigmatism, as by pointing out the position of the meridian of least refraction.

In considering astigmatism we should regard it as being an object of a certain length, which length it is our duty to discover. Now in any of the arts, when it becomes necessary to measure an object the first thing is to determine the position

of one end, and then to ascertain the distance to the other end, taking care that the object does not move during the process of measurement. There is reason to fear that these steps are not always taken in the subjective examination of astigmatism.

The object to be measured, the astigmatism, is what I have called the "remote zone" of the range of accommodation. The farthest end of this zone is the *remotum* of the meridian of least refraction; the nearest end is the *remotum* of the meridian of greatest refraction. The strength of the cylindrical glass required to bring the two *remota* together gives the measure of the astigmatism.

Now the method I have recommended for the subjective examination of astigmatism consists of two steps: first, by means of spherical glasses I shift the patient's range of accommodation so as to bring the *remotum* of the meridian of least refraction to the test-cards at 5 meters (or a little nearer than the cards), and secondly, by concave cylindrical lenses I carry back the *remotum* of the meridian of greatest refraction till it also rests on the test-cards.

It will be seen that by this method mydriatics are not required; for the fixity of the remote zone which is commonly obtained by paralysis of accommodation is here ensured in another way.

The first step of my method fixes one end of the object to be measured and prevents its moving in a way to mislead me; for if at any subsequent moment during my trials the eye accommodates, the lines which remained distinct on the clock-dial will appear less distinct, and all the other lines will be blurred in proportion; and, in fact, as far as we are aware of it, the eye makes no efforts of accommodation. The lines remain unequal in distinctness until we add the cylindrical glass which corrects the astigmatism.

In myopic astigmatism it is the common practice of observers to proceed on a plan closely resembling the one I have just outlined. They agree that the determination of myopic astigmatism is simple. They first correct the meridian of least refraction by spherical glasses, and then by means of concave cylinders correct the meridian of greatest refraction. Now if they did this in cases of hypermetropic and mixed astigmatism, they would not have cause to believe that such cases are especially difficult. Instead, however, of following such a plan in cases

combined with hypermetropia, they take no special pains to distinguish between the two principal meridians, and, not knowing with which they have to do, fail to prevent changes in accommodation which alter the relative value of the radiating lines of the clock-dial. The practical result of this, and of trying now convex and now concave cylinders, is simply to introduce artificial difficulties into the solution of the problem.

By my method, however, the process is exactly the same for hypermetropic and mixed astigmatism as for myopic astigmatism.

This method which I have ventured to recommend in this and other communications³ can, like all other subjective methods, be carried out without the aid of the ophthalmometer; but that instrument can easily be made to render a special service in this connection.

The rules laid down in the preceding portion of this paper show that there are inferences to be drawn from the ophthalmometric reading before the patient has been examined in any other way; but other and more important inferences can be made when the ophthalmometric reading is considered in connection with the answers given by the patient during the subjective examination. Perhaps the most important service rendered by the instrument is that it informs us of the position of the meridian of least refraction of the eye and thereby enables us to interpret the answers of the patient in a highly practical way.

The very first statement of the patient in reply to our question as to the relative value of the different radiating lines on the clock-dial often enables us, with the help of the information given by the ophthalmometer, to state with certainty that the case is one of astigmatism combined with a considerable degree of hypermetropia. In fact it may be said that the use of the ophthalmometer in connection with my special method of subjective examination makes hyperopic and mixed astigmatism often easier of diagnosis than simple myopic astigmatism. As this point has not, so far as I know, been made by any writer, and as it shows in a striking manner the practical value of the ophthalmometer, I may speak of it in detail.

³Bulletin de la Soc. française d'Ophtalmologie, 1895, p. 399.

Ophthalmic Review, 1895, p. 275.

Archives d'Ophtalmologie, 1866, p. 219.

To make my meaning plain, I may relate a case. Examination of the left eye of Mrs. T. P. H. with the instrument shows a direct astigmatism of 3 D. (0+3). The first inference is that the subjective examination will show a direct astigmatism of about 2 D. In other words, we infer with certainty that the horizontal meridian of the eye is the meridian of least refraction, and that the patient looking at the clock-dial placed in the remote parts of her range of accommodation will see the *vertical* lines more distinctly than any other. If then, this patient looking without the aid of glasses, tells me that the horizontal lines (and not the vertical) are the most distinct in the clock-dial at a distance of 6 meters, I infer that that distance is not in the remote part of her range of accommodation; or, in other words, that the patient has a considerable degree of hypermetropia.

The diagnosis of hypermetropia might no doubt be made in many such cases from the observation of a high degree of visual acuity without glasses; but the patient's first answer as to the clock-dial in the case mentioned makes the presence of hypermetropia absolutely certain. Moreover, the ophthalmometer here enables me to proceed to the discovery of the correcting glass by rapid steps, passing over the weaker glasses which would only tire the patient uselessly. I begin the examination, therefore, with + 2 sph. With this glass she still sees the horizontal lines more distinctly than the vertical. I therefore use + 4 sph.; vision is much improved thereby and the lines of the clock seem to be all alike. Still guided by the inference drawn from the ophthalmometer, I give + 6 sph. and now, as has been foreseen, the vertical line is distinctly black and the horizontal indistinct. The clock-dial is now, in a word, in the remote zone. I now correct the refraction exactly for the vertical line, and then, add concave cylinders, beginning with - 1.25, till I make the horizontal line as distinct as the vertical. It is clear that the ophthalmometric reading has helped me throughout the examination, enabling me to proceed with logical precision and certainty, instead of groping in the dark. Cases of this kind are not exceptional, but are constantly met with in our daily practice.

Javal and Schiötz have rendered an immense service to practical ophthalmology by perfecting the work of Helmholtz. The value of their instrument has already made itself felt in

all countries where ophthalmology is practiced, but the field of its usefulness has yet to be thoroughly understood and appreciated. It has already contributed much to our knowledge of what astigmatism really is; and when time will have allowed us to follow our patients through a longer series of years, we may hope to learn, with the aid of this instrument, something of the influences which bring about changes in the corneal curvature.

In the meantime the ophthalmometer, used in the way indicated, acts as a guide and as a check in the search for the correcting glass; and subjective optometry, no longer a wearisome and blind proceeding, subject to error, is made a rational method, as exact and interesting as any employed in physical diagnosis.

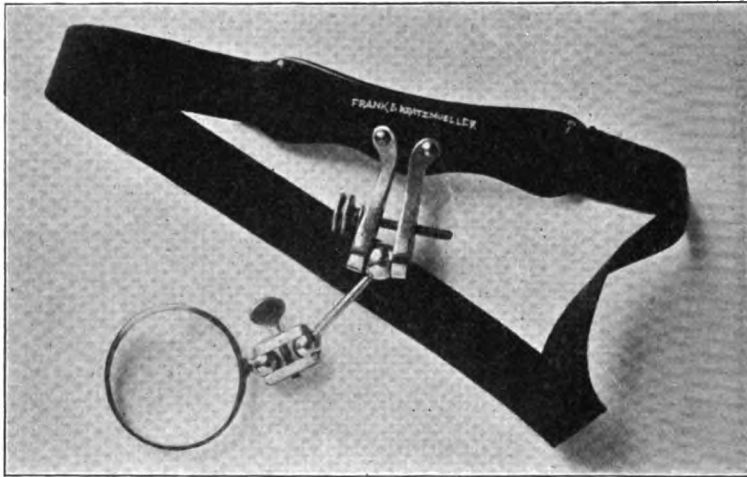
A NEW INSTRUMENT.

BY CHAS. H. BEARD, M.D., CHICAGO, ILL.,

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TO HOLD a convex lens so as to make good focal, or oblique, illumination of the cornea and iris necessitates a certain degree of training. Not even every oculist can do it properly. In many instances, for example, I have attempted to remove a foreign body with the aid of such light as a perfect greenhorn in optics was able to throw upon the cornea, and I dare say it is needless to tell anyone of my colleagues what this means to the operator. Then, too, there are times when we have sore need of focal illumination, and no one, neither trained nor untrained, is nigh to help us. With the view to overcoming these difficulties I have devised, and had made, by Messrs. Frank & Kratzmueller, of this city, the appliance shown in the accompanying cut. It consists of an ordinary head-band to which, in lieu of a mirror, is attached by triple ball and socket arrangement, a common loup, or bi-convex lens, whose focal distance is about two and one-half inches. To use the contrivance the patient is seated near the light, as for the usual focal illumination of the cornea, the band is

buckled, or hooked, around his, or her, head (the one in the illustration is wrongly made with an elastic band), with the lens-holder at the temple corresponding to the eye to be operated, and the loup adjusted to throw the light as desired. Slight oscillations of the head may occur without causing the light to dance away.



I find the device most convenient, also, in searching for those extremely fine cilia which we are often called upon to pull out, or to electrolyze, as, the instrument being fast to the patient's head, and the lens focused upon the border of the lid, our movements do not disturb the view.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

NOVEMBER, 1897.

NO. 11.

ORIGINAL ARTICLES.

ON THE PRIMARY CAUSATION OF ASTHENOPIA.

INFLUENCE OF FATIGUE.

BY WILL WALTER, M.D., CHICAGO, ILL.

OPHTHALMOLOGISTS readily concur in the belief that refractive anomalies are strains producing sundry vicious disturbances; they differ as to what may be considered a border-line degree, within which the symptoms may be looked upon as systemic rather than peripheral in origin. They are not easily moved from their fixed individual positions with reference to the part the extrinsic ocular muscles play—whether apparent imbalances are primary or secondary, anatomical or functional, peripheral or central, and as to what importance attaches to them. The problem will never be solved until we study more into the causal factors.

To introduce the subject of fatigue and its effects into the etiologic consideration, in the February number of the *Ophthalmic Record* we called to mind points of analogy between asthenopia and the fatigue neuroses.

Almost exclusive consideration has always been given to so-called "eye-strain" as the etiologic factor *par excellence*. As to in what manner the strain acts in the production of the symptoms, I have not seen described.

In speaking of the fatigue neurosis, writers cramp, Gay

says: "The education of centers which may be widely separated from each other for the performance of any delicate movement is mainly accomplished by lessening the lines of resistance between them so that the movement, which was at first produced by a considerable mental effort is at last executed almost unconsciously. If, therefore, through prolonged excitation, this lessened resistance be carried too far, there is an increased and irregular discharge of nerve energy which gives rise to spasm and disordered movement. According to this view the muscular weakness is explained by an impairment of nutrition accompanying that of function and the diminished faradic excitability by the nutritional disturbance descending the motor nerves." And Lewis says: "There is a certain limit to which exercise of a given group of muscles may be carried without producing fatigue and local congestion and perhaps inflammatory results; this varies greatly in different individuals, but if it is continually and uninterruptedly overstepped and insufficient time given for rest and recuperation, the centers in the spinal cord which regulate the action of the various muscles become overstimulated and the result is an undue amount of nerve energy induced by the peripheral excitation and there is a distortion of the central impulses in passing through these centers, a perturbation of the co-ordinating power ensues and incoordination is the result. Under rest and appropriate treatment these symptoms may pass away, but if the part is continually used it is highly probable that nutritive changes will be produced in that part of the spinal cord from which the nerves supplying the overtaxed muscles proceed."

Roosa said of asthenopia: "I believe the general nervous condition, especially the nutrition of the nervous system, will have much to do in determining the causes of asthenopia. I point to the asthenopia following typhoid fever as an index of what is meant by this condition." Again, "it has been pretty clearly shown and is capable of wide demonstration that ametropia exists in at least 90 per cent. of the human race" arguing that muscular imbalance is invariably dependent upon heteropia; and "it must not be forgotten that neurotic patients will submit to any treatment, even to ocular tenotomies month after month and year after year, in the vain hope of finally achieving what is possible for some individuals, that is the use of the eyes as

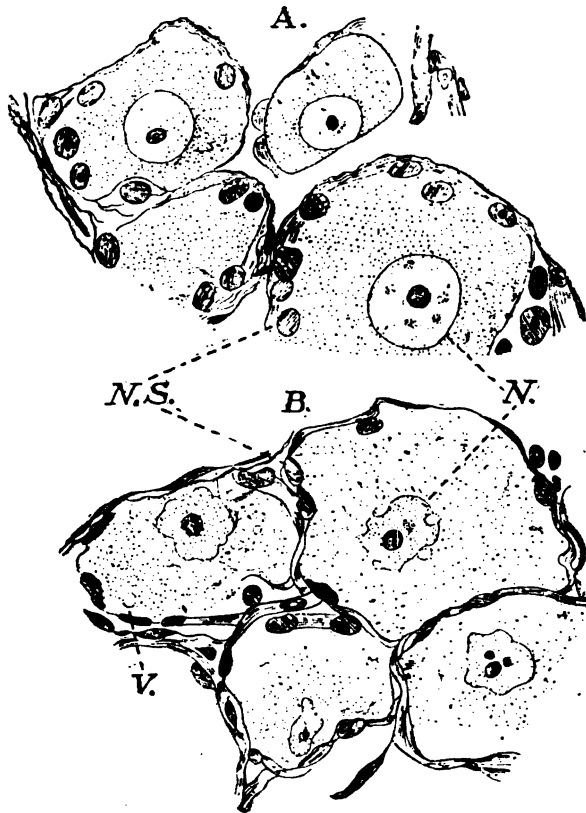
long as they choose, under all conditions, without any discomfort."

Dr. Stevens undertakes to account for all the diseases supposed by a few, with him, to be related to eye-strain, by excluding direct transmission of disease from parent to offspring, and he makes the proposition that such diseases "are the manifestations of transmitted physical peculiarities which render difficult the performance of certain important functions." And "that of the hereditary defects which thus tend to develop neuroses, anomalous conditions of the eyes are among the most frequent and important."

Of these quotations the first two refer to the etiology of an analogous condition primarily to abuse through excessive use, genuine fatigue disease; the third gives prominence to the predisposition; the fourth to the peripheral strain as the *sine qua non* of the affection. The subject is thus furnished us for consideration under the captions, fatigue, predisposition, and peripheral strain.

First, as to fatigue and its possible relationship. With the sensation of fatigue, bodily or mental, all are familiar. It is doubtless related to central nerve consciousness in a manner akin to the muscle sense concerning which little is known. Generally speaking, and from the psychical standpoint of consciousness, we may consider it as the call of the tissues for respite and recuperation. Whether we consider it to arise as the result of the stimulation of centers governing it or a special stimulation of nerve endings or centers, it is generally supposed that it occurs as the result of the formation of so-called fatigue substances the chemical nature of which, though in nerve centers not clear, is in muscle structure quite positive. For physiologists tell us that while no changes are demonstrable in nerve *fibers* as the result of even prolonged stimulation, nerve *centers* are known to develop an acid reaction as the result of activity or stimulation and these substances are supposed to be the direct cause of the fatigue. In addition there is increase in temperature, altered electric reactions and, with the microscope, certain clear and well defined alterations are apparent. Several observers have given definite demonstrations of these changes. Quite recently Hodge has beautifully shown that both the nerve center and nuclei after prolonged stimulation shrink in size, their edges become irregular

and both undergo changes in reactions to staining reagents, the cytoplasm staining less, the nuclei and nucleoli more deeply with osmic acid. Vacuoles appear in the body. These changes of activity are shown in the accompanying illustration,



Two sections, A and B, from the thoracic spinal ganglion of the cat.

B, from the ganglion which had been electrically stimulated through its nerves for five hours. A, corresponding resting ganglion. The shrinkage of the structure connected with the stimulated cells is the most marked general change. N, nuclei. N. S., nucleus of the capsule. V, vacuole. Magnified 500 diameters. —HODGE.

demonstrating the effects of stimulation of the thoracic ganglion of the cat, which was stimulated fifteen minutes and allowed to rest forty-five minutes of each hour for five hours. Hodge has also shown that these are likewise the results of functional activity and are beyond doubt applicable to man.

Functional changes result, viz.: lessened irritability and weakened currents, the direct result of the former being altered reaction time evidenced by the slowed response to various stimuli after the partial using up of the potential energy, the latter necessitating increased stimulation to maintain an uniform strength of efferent impulse.

It is apparent then that what has been known of muscle for some time is coming to be known of nerve centers, that is, that they have within them stores of potential energy, unstable molecules, and that stimulation does not of necessity pass through them, it sets free this energy from center to center.

In muscle the acid products are known to consist of carbon dioxide, sarcolactic acid and acid phosphate of potash. It is thought that the acidity is responsible for the temporary loss of irritability. Under ordinary conditions, however, these substances, being soluble, enter the general circulation, and while freeing the place of origin affect other bodily functions, *e. g.*, the respiratory and cardiac centers as evidenced by their increased activity during exercise. Aside from this obviously the contractile material of muscle is used up—and an analogous condition in nerve centers is not doubted—by the activity; this is in some measure compensated by the increased blood supply accompanying the act under usual conditions of moderate use, entirely so by proper intervals of relaxation and rest. Important requisite for this complex contractile material first, oxygen, which, though not essential to the contractions, *per se*, enters in some way into the composition of the explosive material whose energy is set free by the nerve impulse; and second, pabulum.

Varying degrees then, from fatigue to exhaustion, may arise locally from: either the retention of fatigue acid substances in the muscle or nerve center, an excess of formation over the excretory capacity of the area, or the using up of the explosive material present through decomposition, excess of katabolic over anabolic activity, or a combination of both.

While it is quite clear that the products of the activity in the circulation produce the sensation of fatigue (the effect of transfusion of blood from a fatigue animal to the vessels of a rested one is proof of this) pathology gives some evidence that these substances, whatever their nature—and is probably quite complex—are related much to voluntary effort, that it is the

voluntary effort that wearies and not the contraction. In other words—a subject which has important bearing and which we shall later dwell upon—contractions independent of volition are not productive of conscious fatigue to any extent; hysterical contractures persist for long periods of time without even a sense of lassitude; we know by experience that the sensation of fatigue is different as between that resulting from nerve and that from neuro-muscular activity.

Use or the capacity to endure work without fatigue is relative to acquired capacity through use. So also the load lifted—the work done—has important bearing, and thus we have the following factors influencing fatigue, viz.:

(a) Preceding development; (b) Volume of disponible force; (c) Drainage; (d) The load.

(a) Tissues develop powers proportioned to their activities, due intervals for recuperation being allowed; more than this, develop a readiness to repair, commensurate to the needs and uses. Use fathers growth and development; so abuse, misuse or nonuse degeneration or waste. If requited by rest repair ensues and increased power supervenes. Fatigue will arise therefore inversely as the capacities of tissues are developed independent of all other conditions.

The blood supply has been thought to be an important factor to this. "Transient congestion is the law of physiological activity." Reactionary tonic contraction is the law of physiological rest and this alternation of vascular contraction and relaxation is the rythm of living, growing and useful tissue. In the light of recent investigations, however, these can not be looked upon as primary factors in the increased growth further than they are responses to the demands of the cells whose 'specific energy' through evolutionary and inherited tendency is that of adaptative growth. Exercise operates upon the nutrition of the cell doubtless through not only the blood, but the nerve supply as well. Donaldson, in speaking of nerve cells says: "If excitation falls below the point which causes this, *i. e.*, nutrition, the responsiveness of the cell is diminished, * * * the loss of the impulse which rouses the cell to activity is usually a more important condition than direct nutritive change and must for this reason always be kept in mind." Of the more direct bearing of this upon the causative

factors in the affections under consideration more may be said.¹

(b) The volume of disponible force directly influences fatigue, as we have seen, and we have to consider: (1) The latent energy on hand preceding the work. (2) The maintainance during the activity of a degree of energy short of which fatigue begins.

(c) The drainage of products of tissue change strongly influences fatigue, as we have also seen. It is worthy of note that the mechanical effect of the elastic overlying tissue is a direct aid to this in all muscles in the external groups, an aid lacking in these muscles. The harmful effect of these products rests upon the well-known law that the products of a cell activity are toxic to that cell.

(d) The load lifted. Regardless of certain fundamental laws of tension, stimulation and vigor of contraction which will be later considered, the law of energy dissipation, of supply and demand, is in this instance paramount, and the direct effect of removal of the punctum remotum beyond infinity, the recession of the punctum proximum and other like static alterations, as well as the duration of time the load is held, are apparent.

These are so dependent upon what we shall consider under the head of predisposition and peripheral strain that little attention will be given here. We know that in walking, in the cardiac activity and other like rythmic and more or less automatic functions, action is intermittent and time is given for restoration of energy compounds in the protoplasm and to rid the area of waste products. "Sooner or later, however," as Lombard says, "the vigor of the muscle begins to decrease. The reason for this is not clear." While rythmical contracture is the rule in most mechanisms, in the use of the mechanism under consideration, the periods of relaxation are not rythmically intermittent, nor indeed in many cases developing the distress does the activity remit to any extent during waking

¹It is well known and upon it rests the superstructure of evolution through adaptation, that the developmental power of tissue in response to utility is almost unlimited. The power of a neuro muscular mechanism may indeed be increased by use and proper rest intervals even under unfavorable environment, capacities of function and reparative and reconstructive changes going on hand in hand to surprising degrees,

hours, obviously not at all, as we have before pointed out, in abnormal static states. However, the existence of even isolated cases of individuals who maintain the greatest degree of ocular work with a minimum of relaxation without fatigue and its exaggerations, allows us the conclusion that if metabolism and drainage are not interfered with, sufficient restoration is ordinarily being constantly made that the period of sleep suffices to complete the recuperation and replenish the stores of energy for a subsequent day.

Our four factors are themselves interdependent; each is relative to the other three. So closely too are the preceding development, the available energy and the drainage dependent upon the vitality, and the load lifted upon the peripheral abnormality that the causes of fatigue lead back to the causes of the disease under consideration, and the subject of fatigue and its exaggeration rises to a prominent place in the etiologic consideration. Indeed, it seems rather convincing that the products of fatigue (whether of nerve or of muscle) may be the elements of chief interest, the chemical stimuli in most cases of asthenopia and the many pathologic conditions related to ocular activity. Further consideration of the remaining propositions will show some reasons for this thought. Considering here, however, only fatigue and the influences of use, we have to deal first, with effects *in situ*, second, with resulting muscular incoordination, and third, with reflex effects arising symptomologically.

In other words, it is apparent that these causes may be operative anywhere throughout the visual-motor tract from the ideo-motor through motor centers to nuclei and muscles. And if you grant me space for theory I conceive that if these substances produce their effects in muscles alone, for instance, the first effect must be upon muscle power and tone, this may lead to disturbed muscle sense and to incoordination; so also if the effects be upon a center, like disturbances of muscle may follow or from any portion may stimuli be directed and following along lines of least resistance evidence their effects in terminal organs more or less remote.

As a matter of fact the work of physiologists goes to show that the muscle is the last part of such a tract to undergo the

effects of fatigue.² Whether it be proven that the center, more probably series of centers, having control of this most sensitive of coordinations lies in the tubercula quadrigemina; whether there be a center for convergence as shown by Adamueck and one for conjugate or associated lateral movements; whatever theories or demonstrations ultimately maintain, there must obviously be a coordinating mechanism, and as such it is the requirement of binocular vision in the first place and binocular convergence secondly, and has the higher functioning. In addition, we must assume as its correlative function, that of inhibiting antagonistic coincident with stimulating acting muscles.

Now that which is the lowest in the scale of development becomes the most independent, enduring, and indeed perfect in its functional activity. Hence, in the act of reading and like uses of the eyes this coordination which early requires the constant guardianship of higher centers comes through habit capable of independent action—and of necessity for its complex and rapid working—requiring only the stimulus to begin or the inhibition to cease or alter the coordination. When from any cause this reflex activity is impeded special direction becomes necessary and the higher centers not used to such effort are called into play and these from the very lack of adaptation become readily fatigued, greater effort and concentration becoming necessary as fatigue of the higher centers progresses. If then, we imagine the lower centers in a state of primary exhaustion when the higher stimulus is again directed and it is urged to further effort, there will surely come a time when, from excessive nervation, or from deficient functioning power, or both, incoordination will result. The stimuli will take diverse directions and establish for themselves courses over lines of least resistance; and not only may this result in incoordination through the misdirected stimuli, or failure to inhibit the antagonistic muscles, or fatigue of any other of its complex acts, but inhibit reflexes from the frequent repetition of a like process. Further than this, the time required for recuperation of such cells is greater as they are more exhausted;

²If after exhaustion by voluntary muscular work the muscle be stimulated by the electric current, contraction will again result.

and it is not difficult to see wherein the at least functional weakness may become more or less permanent.

That the exaggeration of fatigue is pain and disordered movement anyone may prove by employing an unused group of muscles. Incidentally, it will also show that it is the effect on the coordinating and higher centers—the group mechanism—and not the muscles, for the latter may immediately be used for other purposes not only without pain but sometimes with apparent relief. Take the unusual act of holding the arm outstretched on a lateral plane with the body. Directly the muscles feel wearied, then painful, the experimenter becomes conscious of special direction, it is impossible to keep the attention from the act, the energy overflows into auxillary muscles, irritability will supervene and if it is possible still to continue the experiment the arm will fall exhausted or will exhibit spasmodic contraction; there will be neuralgic pains about the back and perhaps a general weakness will follow. An experiment more *à propos*, is that of adding a load to the ciliary or to the extrinsic muscles by employing a minus lens or a prism of moderate degree. If the work be voluntarily forced to extremes the effects, though varied as between individuals, will show the above exaggerations of fatigue and reflexes of various natures. In some temperaments the effects are more rapid, the pain and nervousness more severe; they will nevertheless be produced in the least neurotic or the most robust.

The amount of work of which a mechanism such as the oculo-motor is capable without fatigue and its exaggerations—all of which may well be included under the name *dyscinesia*—depends then upon the uses to which it has been previously put, which, with the environment during the developmental period, determines the condition at the time of beginning activity; second, the metabolic activity during the period of use—whether the ratio of anabolism to katabolism falls regularly or for any period of time; third, the removal of the products of metabolism; and fourth, the load lifted, determining within measure the energy loss. When the work begins to fail and special direction becomes necessary, fatigue as a consciousness really begins and the exaggerations quickly follow upon subsequent abuse. On this argument the pain, the ciliary spasm, the excessive or weakened contraction of an extrinsic muscle—heterophoria of a more or less stable degree or

kind—or the reflex and perhaps other supposed evidences of eye-strain may under certain conditions be the result of absolutely normal kinetic states, or a slight structural abnormality or vicious habit of use may be a sufficient added load to cause distress in the failure of the other essentials to normal use. Conversely by the perfect action of metabolism and drainage, otherwise excessive abnormality may be readily borne if only time has been given for adaptive development under favorable environment.

SOME OF THE PHYSIOLOGICAL FACTORS CONTRIBUTING TOWARDS MAKING THE EYE EMMETROPIC.¹

BY E. S. HEISIG, M.D., HOUSTON, TEXAS.

[CONCLUDED FROM OCTOBER NUMBER]

But whether this mode of development be accepted or not the great fact admitted by the highest authorities remains that the hyperopia of infancy and childhood becomes less, may become emmetropia, and even go over to myopia. This is concurred in by such men as Noyes, Nettleship, Fuchs and others. For instance, Noyes ("Diseases of the Eye," first edition, page 81) says: "It is evident that the axis of the eye increases in higher ratio during the early years of growth than do the optical parts."

Now what regulates this action?

If this comparative elongation of the globe took place indiscriminately in all eyes during the growing period, all emmetropic eyes would become myopic; all myopic eyes would become more so, and even hyperopic eyes would seldom by mere change stop this action just at the point to make them emmetropic. The probability would certainly be that the action would either be insufficient or excessive, the eye thus either remaining hyperopic or becoming myopic.

The essential regulating factor I think we will find in the refractive state of the eye. This is easily explained if we ac-

¹Read by title before the South Texas Medical Association

cept the theory laid down as to how the elongation is brought about, and has in fact been to a certain extent anticipated.

Let us now more fully examine the regulating influence that the three refractive states of the eye known respectively as emmetropia, hyperopia and myopia exercise on this process.

The refractive state known as emmetropia or the ideal state of refraction for the eye, exercises an inhibitory influence on the process of physiological elongation, and this inhibitory action may be said to be in inverse ratio to the degree of hyperopia when this state of hyperopia exists. This is highly important and exemplifies one of those wise provisions of Nature, for when the process has gone from hyperopia to emmetropia, to be beneficial it must cease. It does so in the vast majority of instances because the conditions producing the muscular action described are no longer present. The accommodation is no longer brought into play for distinct distant vision, in fact it would preclude such; the concomitant act of convergence and the antagonistic action to maintain the parallelism of the axes of the eyes, all of which as we have seen exercising compression of the globe, are no longer operative.

Under this inhibitory influence also the process of elongation is not started if the eye is already in a state of emmetropia. Of course, the fact is not lost sight of, that the emmetropic eye exercises its power of accommodation in proportion to the nearness of the object looked at, but this action is normally intermittent instead of constant, and if near objects occupy the greater portion of the waking hours thus substituting a continuous for an intermittent action even in this state, one of the causes that is capable of inducing an elongation of the eye is certainly put in motion, and is, I believe, generally conceded one of the most frequent causes of myopia. The extrinsic muscles are also called into action by the emmetropic eye, but the effort of convergence is in proportion to the nearness of the object viewed and the amount of accommodation exercised, and does not necessitate antagonism except a sufficient amount to steady the eye.

The influence which the refractive state of the eye known as hyperopia has on the process of physiological elongation of the axis of the globe, or rather on the muscular action producing the same has already been anticipated in describing the process itself. It may not be amiss, however, to briefly allude

to it again. The hyperopic condition of refraction necessitates the use of accommodation for distinct vision of even the most distant objects and an excessive amount for near ones. The amount of accommodation for objects twenty feet distant or more, and the excess over the normal for all nearer objects is in direct ratio to the degree of hyperopia. But to a given amount of accommodation exercised a certain amount of effort of convergence will unconsciously be a concomitant, and as in looking at distant objects practically no convergence of the visual axes is tolerated, this in its turn necessitates the action of muscles to counteract this effort of convergence. In viewing nearer objects the excessive amount of accommodation required will also produce too great efforts of convergence, which will have to be overcome in the same way.

This description of the action of the extrinsic muscles of the eyes in hyperopia finds strong confirmation in the fact that this condition furnishes the greatest number of cases of convergent strabismus.

Hence we see that the condition of hyperopia favors this process by which a physiological lengthening is brought about. And I will, at the risk of the charge of repeating, lay stress on the fact that in this condition the muscular action described is continuous, not only during the waking hours, but in consequence of spasm of accommodation, which all authorities admit exists nearly always in this state and called by them latent hyperopia, that part of the process goes on even during sleep. In the emmetropic eye as is well known the condition of comparative muscular rest exists except when exercised on objects nearer than twenty feet. It is true the muscular action which brings about this elongation of the antero-posterior axis of the eye is not as active during the sleeping as during the waking hours, but we might metaphorically say that the action during sleep is sufficient to hold the advance made during the waking hours next preceding until the succeeding waking hours with its increased action shall carry the process still further. This continuous action has further importance in view of the fact that any organ certainly has at least a tendency to develop permanently the form in which it is held for a protracted period of time even after the force so holding it has been withdrawn. This is so self-evident than it forbids further notice here.

Finally, let us examine the influence exerted by the state

of refraction known as myopia. This influence will be found to be in part the same as that in emmetropia, and the more so the more the condition approximates emmetropia, *i. e.*, the lower the degree of myopia the more nearly will the influence be the same, or the less will be the effect of the new elements considered below. This is in some respects unfortunate as the higher degrees require this influence the most, but as the degree increases other factors present themselves and to these other factors is due the fact that the inhibitory action is frequently entirely perverted in this state. Let us examine this more closely. As we have said the lower degrees when uncomplicated by new factors practically exert the same influence as emmetropia. But this simple inhibitory influence as exercised by the emmetropic state of refraction must be often absent, and hence we often find the influence insufficient or entirely perverted, and the tendency of the refractive error to increase. The disturbing factors I shall now mention are those acting through the extrinsic muscles, and the intrinsic muscle of the eyes. In myopia an excessive amount of convergence is required both relative and absolute. Absolute when the ametropia is sufficient to necessitate the bringing of the object closer to the eyes than normally required, and relatively in proportion to the amount of accommodation exerted. The latter is probably the more important of the two as it must always be borne in mind that a strong sympathy exists between the two acts, and that this sympathy is reciprocal, *i. e.*, that not alone does the act of accommodation induce involuntary effort at convergence, but that the act of convergence induces efforts of accommodation. That the latter takes place finds confirmation in the fact recognized by most oculists, that the apparent myopia is frequently more than the absolute. But this increase of accommodation will necessitate still stronger efforts at convergence in the higher degrees of myopia as the object will have to be brought nearer to the eye. If the above be correct we can understand how, although in myopia it has always been taken for granted that accommodation is very little exercised, that this is true only in regard to the range of accommodation, but that in reality it is in a constant state of exercise compared with the emmetropic eye. These two factors then, a continuous, although limited action of the ciliary muscle instead of an intermittent one, and the excessive and al-

most constant action of the extrinsic muscles, both brought about by the myopic state of refraction readily explain, I believe, the tendency of the myopic eye to become more so. For these are essentially the conditions obtaining in hyperopia, *i. e.*, the eyeball is constricted between the two poles of the eye, and this must of necessity tend toward its elongation. In the case of hyperopia the process is one of physiological development, while in myopia it is rather one of over-stretching, the posterior part of the eye giving way as being the weakest point.

To the results of the action of the extrinsic muscles already described in myopia must be added that in extreme convergence of the visual axes there must be a corresponding divergence of the posterior poles of the eyes which will in its turn be more or less interfered with by their attachment to the optic nerves at this place. This resistance offered by the entrance of the optic nerves causes the condition known as the myopic crescent in which there is a giving way, or at least a changed relation of the tunics of the eye at this point. The continued action of even moderate convergence such as occurs when persons with emmetropic eyes are engaged too much with near vision probably exerts a like action. In fact, this substitution of continued instead of its normal intermittent action in all its varieties can not be too strongly dwelt upon.

In the case of hyperopia then, the process of elongation being a physiological and compensatory one, let us enumerate a few of the requisites, the absence of which may interfere to a greater or less degree with its full development.

- I. An instinctive desire and capacity for comparatively continuous distinct distant vision. This is imperative, as without this the process described is either not put into continuous active operation, or is not perfectly regulated. The failure of this prerequisite may be due to extreme degrees of error, to a low grade of visual acuity, to a certain functional incapacity of the muscles of the eyeball, the effort in each of these cases for continuous distinct distant vision being too tiresome to keep up. The failure of the same may also be due to what may be called mental inaptitude.

But as we have seen, the process may prove excessive, and what was physiological and conservative in the first instance may become secondarily pathological and detrimental.

I will only briefly allude to one or two of the causes that may bring this about, as I am afraid I have already taxed your patience too much.

One of the main causes is the excessive use of the eyes on near objects, especially during the period of growth, an indoor life alone precluding distant vision aiding largely. It is now in the light of what has been said easily understood how this is brought about if we bear in mind the refractive influence of emmetropia on the physiological elongation of the eye when the eye is engaged for the most part of the time, as it normally is, in distant vision. This influence as pointed out is an inhibitory one by suspending the continuous and excessive muscular action by which the process is carried on. But this inhibitory influence is only exerted when the eye is either functionally inactive or is engaged in distant vision, hence if we are constantly occupied with near objects this inhibitory influence is suspended, and the process described is too actively carried on.

Another cause is spasm of accommodation from whatever cause as the process reaches the emmetropic line thus acting in the same way as the myopic state of refraction already described; in other words, the action is no longer under the control of the regulating influence of the normal refractive quality of the eye as a state of myopia is artificially induced.

There is another cause that may be said to act passively, namely, a weakened condition of the tunics of the eyeball, especially the sclerotic coat.

To conclude this paper I offer the following as a summary of what has been attempted to be maintained:

1. That the vast majority of eyes at birth are hypermetropic.
2. That the ideal state of the fully developed eye is emmetropia, and that hence the eye at birth and for some time thereafter must be considered as passing through a stage of development, functionally or physiologically, as well as anatomically.
3. That the primary cause tending towards making the eye accurately emmetropic after birth is the instinctive desire and effort for continuous distinct vision of distant objects.
4. That the secondary cause is the tendency of the eye in common with other organs, especially during the period of

growth to develop the form in which it is held during a protracted period of time and that this form will be found to be that in which parallel rays of light are accurately focused on the retina, because during the greatest part of the time the eye is normally engaged with distant vision.

5. That this form is physiologically developed by muscular action regulated by the refractive quality of the eye.

6. That this compensatory action may be insufficient, in which case the hyperopia remains, and that this is most frequently caused by failure of continuous distinct distant vision, which in its turn may be due to extreme degrees of the error, to a low grade of visual acuity, or to mental inaptitude, in all of which the effort of distinct distant vision is too tiresome to be kept up.

7. That this otherwise conservative action may overstep the physiological boundary and become pathological, in other words, prove excessive, in which case myopia with its concomitant evils is produced, and that this is most frequently caused,—first, by the excessive use of the eyes on near objects especially during the period of physiological development, or by spasm of accommodation in which the action is no longer under the control of the regulating influence of the refractive quality of the eye; and, secondly, passively, by a weakened condition of the tunics of the eyeball.

A PLEA FOR MORE MILD TREATMENT OF THE CONJUNCTIVA.¹

BY E. W. AMES, M.D., CANTON, ILL.

IN presenting "A Plea for More Mild Treatment of the Conjunctiva," I desire to state that I advocate no drugs which have not been numbered among the multiplicity of remedies used in the treatment of affections of the conjunctiva. The combination of drugs which I advocate has been used by me in the treatment of acute catarrhal conjunctivitis, chronic

¹Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

catarrhal conjunctivitis, follicular conjunctivitis, phlyctænular conjunctivitis, and trachoma, with its accompanying pannus.

I shall not dwell upon the symptoms, course, etiology and complications of these diseases, except as it may be necessary to illustrate therapy.

The remedies which have found most favor and stood the test of time are the salts of zinc, copper sulphate and silver nitrate, together with some one of the antiseptics. Each of the remedies mentioned is an irritant astringent, and when used in such strength as to be potent for the chronic forms of inflammation, the reaction following the application is long continued and painful.

Relapses with exacerbation of the inflammation while under treatment are the common experience of every oculist. This always necessitates discontinuance of the astringent remedy until the eye recuperates from the intolerance which it has manifested. While the eye is undergoing this revolt the lesions are often re-established with such remarkable rapidity that when the oculist again ventures an aggressive treatment he may find the condition as far from cured as when the treatment was first begun. The remedies above referred to can not with prudence be placed in the hands of the patient to be used at home. Thus really curative treatment can be applied only at the office and therefore much time, valuable to the patient, may be lost.

To illustrate the treatment which I wish to recommend, we will consider a patient with a severe attack of acute catarrhal conjunctivitis. The secretion has become muco-purulent, the lids are sealed in the morning and there is the characteristic itching, photophobia and pain. The conjunctival sac should be flushed with a solution composed of formalin one part to two or three thousand part of boiled water. The upper lids are then raised or everted and the fornix conjunctivæ filled with a solution composed as follows: Boric acid gr. v, tannic acid gr. lxxx, glycerin fl̄ iv, distilled water sufficient to make fl̄ j. The pain from the application of this solution is quite severe, but lasts only from one-half to one minute; the patient then only complaining of a "sandy" sensation. The conjunctival vessels become intensely injected, but this rapidly subsides, and in twenty or thirty minutes the membrane is paler than before the instillation, the eye feeling cool and soothed.

The patient may be provided with a vial of each solution and instructed to use the drops every two or three hours when awake. On the following morning there will be but little secretion, the lids not being sealed, and the eye a useful organ. Under this treatment complete recovery takes place in two or three days, providing the acute attack has not been grafted onto a chronic condition. Our authors acknowledge that under the treatment usually recommended this disease is but slightly shortened in its course, the principal aim of treatment being to prevent a chronic inflammation as a sequel.

The merit of a therapy can not be estimated when the experiment is confined to diseases which tend to spontaneous recovery; hence I will devote the balance of my paper to the consideration of trachoma.

CASE 1.—About two years ago I was consulted by a poverty-stricken individual who was suffering with trachoma of several years' standing. He was 50 years of age, used tobacco in quantity and manner peculiar to an inhabitant of the Missouri river bottom. Vision and photophobia were such that it was with much difficulty that he performed his farm work. The margins of the corneæ were covered with pannus. The lids were lined with a thick coat of granulations and entropion was quite marked. He asked for a prescription stating that he was unable to pay for such treatment as he should have. I prescribed a solution containing boric acid gr. v, tannin gr. xxx, glycerine flʒ ij, and water sufficient to make flʒ j, and directed him to drop one or two drops in each eye, four times daily, stop the use of tobacco, and when he could afford a proper fee, come to me for appropriate treatment. About four months after this I met him on the street and noticing that he wore his hat well back on his head, having no intolerance of light, I accosted him and learned that he had been having my prescription refilled and had used it faithfully. The pannus was gone and the corneæ were clear. I did not examine the lids.

CASE 2.—November 14, 1896, I was consulted by Amos W., aged 34 years, farmer. History, left eye sore frequently since a boy at school. Eight months ago the left eye became much worse and the right eye also became affected. Had been treated most of the time since that date. Vision, $\frac{20}{60}$ either eye. Diagnosis, trachoma either eye, pannus either eye, worse

on left; leucoma, left in pupillary area. I advised him to stop the use of tobacco (which he did not do), and as he lived ten miles distant, I provided him with a solution composed as follows: Boric acid gr. v, tannic acid gr. xij, glycerine fl℥j, water sufficient to make fl℥ss. Directions, drop two or three drops in each eye four times daily. He reported at my office two or three times each week, when I cleansed the conjunctival sac with the formalin solution and instilled a saturated solution of tannin in equal parts of glycerine and water. All of the distressing symptoms subsided in three days, the pannus cleared away, and two months from date of beginning treatment I discharged the case, cured. He recently came to my office and I found that the cure has remained permanent; the lids were thin and pliable, there being no cicatricial contraction which often occurs as a result of strong caustics more than as a result of the disease itself.

CASE 3.—December 15, 1896, I was consulted by J. R. R., aged 55 years; occupation, had been running an emery-wheel in plow shops for sixteen years. During February, 1896, he was compelled to quit his work on account of trachoma. He was treated a short time by his family physician who then advised him to go to the Illinois Charitable Eye and Ear Infirmary. He was treated at the Infirmary four months with some benefit and was sent home, seemingly, on account of the institution being overcrowded. His eyes became rapidly worse. He consulted a local oculist who treated him four months. Complaining that he received no relief he was discharged with directions to bathe the eyes in hot water several times daily. He followed this advice for about one month, at the end of which time he consulted me with the eyes in the following condition: Vision, either eye, ²⁰/_{CLX}. Slight entropion of right lower lid. Entropion of left lower lid quite pronounced. Puncta in very good position. Epiphora marked, both eyes, with a profuse muco-purulent secretion. Pannus slight of right cornea and quite intense of left cornea. The right upper and lower lids were lined with a thick layer of trachoma granules. The left upper lid was much worse in this respect, having a cauliflower appearance. The patient remained at my office during hours and I treated him as heretofore indicated from three to six times daily. He was provided with a weaker solution of the depleting astringent which he used at home morning and

evening. The purulent secretion had ceased by the second day. At the end of the first week of treatment the vision of the right eye was $\frac{20}{XLV}$, vision of left eye, $\frac{20}{LXX}$. At the end of the second week the tarsal cartilages were shining through, there being here and there a little tuft of granulations. I now allowed him to resume work in the dusty shop, treating him once daily. At the end of six weeks from date of beginning treatment the granulations were gone, there being only a slight roughness of the tarsal conjunctivæ. The epiphora still continued. A marginal pannus which existed at the beginning of treatment had cleared away.

I for some time saw the case but once or twice a week, when I probed the nasal ducts, having the patient use only a 1 to 3000 formalin solution at home. Though I was able to pass a No. 6 probe through the nasal ducts to the floor of the nostrils, the epiphora continued. A slight roughness of the tarsal conjunctivæ persisted and with a tendency to increase after the astringent treatment was abandoned. Upon examination of the nostrils I found some hypertrophy of both inferior turbinated bones, septal spur right and anterior, and hypertrophy along base of septum on left. I removed the spur with a saw and reduced the other hypertrophied parts with the galvano-cautery. When the reaction from the operation subsided the epiphora became promptly relieved. The slight exacerbation of the conjunctival trouble subsided promptly under a few treatments of the depleting astringent.

I think in this case there not only existed an increased quantity of lachrymal secretion which was caused by reflex irritation from the rhinitis, but there was an actual mechanical obstruction at the lower orifice of the nasal duct due to turgescence of the mucous membrane in the inferior meatus. I believe oculists do not pay sufficient attention to this condition. There are surely many cases in which mechanical obstruction exists that can not be accounted for by either stricture or a flaccid condition of the membrane within the duct. It is reasonable to suppose that stenosis can occur at the lower orifice of the nasal duct from causes analogous to those which cause primary closure of the lower orifice of the Eustachian tube; yet how many of these cases are treated long and patiently without attention being given to the nostril?

I have many other cases which I could report, but the

ones which I have cited illustrate that a mild, depleting astringent and antiseptic therapy for trachoma is worthy of your consideration.

There is no disease of the eye regarding which such a mass of literature has been produced as on trachoma. This is accounted for by the fact that no satisfactory treatment has been secured. Severe cases have been cured, but the treatment extended over many months and often years; and oft-times the result of the treatment is a cloudy cornea or a cicatricial lid which leaves the patient disfigured for life. Mild treatment has been used as a matter of necessity as an adjunct to the trachoma forceps, a brush, or caustics; but I wish to emphasize the fact that the mild treatment which I have indicated will speedily cure the severe cases and is not in itself harmful to the eye.

Some of the advantages of the treatment may be summed up as follows: It is quickly curative. It promptly relieves the distressing symptoms. It can be repeated many times daily, thus obtaining a rapidly curative action. It is so mild that it does not interfere with the occupation of the patient, and may with safety be placed in his hands for use at home, thus securing a continuous therapeutic effect. Keratitis does not contraindicate its use. There are no evil sequelæ to the treatment such as argyrosis, and cicatricial contraction. No relapses occur on account of an intolerance of the membrane, necessitating suspension of aggressive treatment.

SUBCONJUNCTIVAL INJECTIONS OF SODIUM BICHLORIDE SOLUTION IN THE TREATMENT OF IRITIS, KERATITIS, CYCLITIS AND CHOROIDITIS.¹

BY S. L. LEDBETTER, M.D., BIRMINGHAM, ALA.

I HAVE selected this subject, not for the purpose of airing my own views, nor because I have had a very extensive experience, for I have not. I have noticed from time to time,

¹Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, May 8-9, 1897.

in current literature, references to the bichloride injections in the treatment of certain eye troubles; a treatment introduced by Drs. Abadie and Darier of Paris. But outside of Dr. Briggs' paper, read before the Ophthalmic Section of the American Medical Association in 1894, and some short notices by Dr. May in his "Reviews of Current Literature," there does not seem to be anything of consequence in our American journals.

Last year, however, Dr. Veasy had published in the AMERICAN JOURNAL OF OPHTHALMOLOGY an article entitled "Subconjunctival Injections of Sodium Chloride as a Substitute for the Bichloride Solution in the Treatment of Certain Eye Troubles." He claimed to get equally as good results and a great deal less pain from his salt solution. His reasoning seemed good, and the results so flattering, that I decided to give the treatment a trial. I have done so and will report the results in a few cases. I shall not select them from cases which have done best, but just as they came. In some instances the cases were not kept under observation long enough to make anything of them and so are not available for a report. They of course will have to be omitted.

CASE 1.—The patient, a young girl, with subacute iridocyclitis. The trouble was sympathetic and had been operated upon several times with a view to restoring the obliterated pupil, but to no purpose, each operation leaving the eye in worse condition than before. The fibrous deposit on the iris had grown to be very extensive and the circumcorneal injection never seemed to clear up entirely. I decided that I would attempt no further operations until this ciliary irritation had entirely subsided. Then I began the subconjunctival injections of salt 1 to 500. Only three or four were given, when the patient returned to her home. A month or so later she came to see me again. The eye was perfectly clear. The lymph deposit had narrowed itself down to one heavy, dense band running across the iris.

CASE 2.—A young boy, brought to me a few months ago, with a traumatic iritis and cataract. The pupillary margin was adherent to the lens capsule. The inflammation was considerable and had existed for a month or more. I ordered a solution of atropia and began the saline injection. In two weeks the inflammation was entirely gone, and the pupils partially dilated. The cataract of course was still in force, but the re-

covery from the inflammatory condition was prompt and satisfactory.

CASE 3.—A negro man, aged 40 years, came to see me the past winter with chronic iritis, of syphilitic origin. Both eyes were involved and in each there was complete posterior synechia. The pupils were contracted to the size of a small pin-head. A few weeks of the subconjunctival injections, and the inflammation, which had existed for several months, was gone. Under the influence of belladonna the pupillary adhesions were partially broken up, but did not melt away as they did in some of Dr. Veasy's cases.

CASE 4.—A young woman came to see me on November 14 of last year with a choroiditis of the left eye. She could count fingers with difficulty at six inches. The vitreous was so clouded that the ophthalmoscope could not be used. Three months of the usual treatment brought the vision up to counting fingers at three feet. On February 10, I began the saline injections. March 3, she counted fingers at ten feet. The vitreous is still full of small floating bodies, but the vision is rapidly improving. She has now (April 1) vision of $\frac{15}{60}$.

CASE 5.—A young negro boy came to me February 19, 1897, with what seemed to be a clear case of interstitial keratitis. I gave him three or four injections. The inflammation subsided. The trouble disappeared as if by magic. This perhaps was the most remarkable recovery of all. Two weeks' treatment, all told, and the eye was practically well.

CASE 6.—Mrs. D., white, aged about 35 years, developed syphilitic iritis in January. The usual treatment for such troubles was prescribed and the case progressed nicely for a while, then the condition became alarming. The iris was covered with lymph, the aqueous was muddy, and the cornea steamy and filled with exudates. The vision was reduced to perception of light. Pain and photophobia were intense. I began the saline injections, giving them daily for a few days, then every other day for a while. In a week the eye was free from pain, no photophobia, the pupil dilated except below where the effusion was very extensive; could count fingers across the room. The progress was phenomenal, but another relapse came, the eye was apparently as bad as before, and the same treatment was adopted. The eye eventually cleared up, but not as rapidly as before.

I have used the saline treatment in a number of other cases. In phlyctenular ulcers where, under the usual methods a cure can be expected,—in a reasonable time anyway. Some cases have been imperfectly kept up with and so can not be utilized in a paper.

As stated in the beginning, this paper is intended to promote discussion and to get an expression from those who perhaps have had a more extensive experience with the treatment than I. If there be any good in the treatment, if it has any therapeutic value, I would like to know it. As there seems to be no harm in it, I shall continue to use it in all cases where other measures seem slow and unsatisfactory, or until its efficacy be disproved.

SUBCONJUNCTIVAL INJECTIONS OF BICHLORIDE IN THE DEEP-SEATED DISTURBANCES OF MYOPIA.¹

BY FRANCIS S. KELLOGG, M.D., LOS ANGELES, CAL.

I TAKE this opportunity to briefly report two cases of myopia complicated by choroidal and retinal involvement in which injection of bichloride gave marked relief.

CASE I.—Mrs. A. B., aged 57 years; has worn — 6.50 sph. both, for many years. Is delicate, of nervous temperament, and looks much older than she is. First consulted me in December, 1893. At that time she reported that five years previous she began to notice, when going from the light into the dark, a bright light before the left eye, which would gradually fade away. This phenomenon continued to grow more marked during the next three years. At the end of that time she says that a dark cloud, tipped with bright points rose suddenly from below. Three months later an object, shaped like a fan, seemed to encroach from the inner angle of the eye. It was of a dark bottle green color and “covered the sight in one month.” (Detachment of the retina). Since that time she has

¹Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Rhinological and Laryngological Association, held in St. Louis, April 8-9, 1897.

been annoyed by phosphenes in this eye which take the appearance of a bright light running in a circle, and always from without inward.

Present condition (*i. e.*, at time of first consultation): Tension of left eye slightly minus. Pupil contracted to the size of a small pin-head and adherent to the lens, which is calcareous. No l. p. The eye is often quite sensitive to touch and the phosphenes are very trying, being always worse at such a time. Right eye, for the past month has noticed a bright crescentic figure of light in this eye, which comes and goes. Also floating films before the eye. Reports that glasses were increased in strength to — 8.50 one year ago.

The appearance of phosphenes in the right eye naturally gave rise to great solicitude for fear her experience with the left eye was to be repeated in the right. Dilatation of the pupil at this time showed peripheral opacities in the lens, posterior staphyloma and some opacities in the vitreous.

I adopted a systematic course of injections of bichloride, 1 : 1000, under the conjunctiva, at intervals of one week. The relief was immediate. The phosphenes were diminished in intensity so that they ceased to annoy as long as the injections were kept up. The irritability of the right eye seemed clearly to depend to a certain extent upon that of the left. This was demonstrated by the fact that the phosphenes in the right eye were controlled by the injections in the left. After a time, at the suggestion of a writer in one of the journals, I reduced the strength of the solution to 1 : 15000. The stronger solution was followed by considerable reaction which was avoided by the weaker, which seemed to be equally effective.

The evident sympathy of the right eye in the irritation of the left together with the recurrence of phosphenes in the latter whenever the injections were omitted, led me to advise enucleation of the blind eye. This was done June 10, 1895. Since that time the right eye has given very little trouble. There has been no progress in the myopia and only feeble returns of the phosphenes. These have been easily controlled by the injections, the patient always presenting herself at such times.

CASE 2.—Martha F., aged 20 years. Myopia complicating exophthalmic goitre. She came under my care in May, 1895. She reported that a few weeks before she noticed a spot be-

fore the right eye about the size of a pear and of a green color. This remained stationary for two weeks when it increased in one night to the size of a dollar. At first she could see through it, but after its increase in size it lost its transparency. Ophthalmoscopic examination disclosed myopia of 9 D., a posterior staphyloma and two small hæmorrhages in the region of the macula. The condition of the left eye was identical except for the hæmorrhages. At the time treatment of the right eye began the "green spot" or scotoma had become partially transparent. There were also phosphenes in this case. She was put upon injections of bichloride, 1 : 15000, twice a week. The phosphenes at once disappeared and the vision of the right eye improved so much that she could see better with it than with the left. This may have been partially due to the absorption of the hæmorrhage, in the course of nature, but I am inclined to give the injections credit for assisting in bringing this about. Constitutional tonic treatment was also given and the goitre treated with injections of protonuclein special. Under this treatment the circumference of the neck was reduced from 33 cm. to 31 cm

A CASE OF OPTIC NERVE ATROPHY TREATED BY INHALATIONS OF NITRATE OF AMYL.¹

BY CHARLES W. KOLLOCK, M.D., CHARLESTON, S. C.

ON JULY 10, 1896, Wm. M., white, aged 63 years, consulted me on account of blurring of the vision of the right eye, which, he said, had been noticed for a month, and was gradually increasing. He was a strong, large-framed and muscular man, of Scotch descent, and in good health. He had used tobacco constantly for many years and was a moderate drinker of whiskey. The heart was in good condition and the blood vessels were no harder than would be expected in one of his age. The external appearances of the eyes were normal and the pupillary reflexes were good. R. E., V., $\frac{15}{\infty}$, and with + 2.50 D. $\frac{15}{LXX}$. L. E., V., $\frac{15}{\infty}$, and with + 2 D. $\frac{15}{XV}$.

¹Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

With + 4 D. the left read Jaeger No. 1 with ease. The ophthalmoscope showed the right disc slightly hazy, a little swollen and with veins somewhat engorged. The specific gravity of the urine, which was normal in appearance and quantity, was at the first examination 1010, but within a day or two became 1020 and has remained so. No albumen or sugar has been found at any time. The field of vision was concentrically contracted, but there was no scotoma and the color perception was at all times good. He was given ten grains of iodide of potassium before each meal, and this dose was gradually increased until he took sixty grains a day, when the stomach was upset. In the meantime strychnine (sulphate) was prescribed, beginning with one-twentieth of a grain and gradually increasing until he took one-tenth of a grain three times during the day. The vision did not improve, but slowly decreased, until he could barely see $\frac{15}{\infty}$ with + 2.50 D. The disk became whiter and more distinct and the arteries contracted visibly. It should have been stated that tobacco and alcohol had been interdicted and given up from the first. As the vision continued to fail and the nerve to become whiter it was decided to try the effect of nitrite of amyl.

On September 26, more than two months after his first visit, he was allowed to inhale the vapor of a few drops of nitrite of amyl that had been placed upon absorbent cotton. Before inhalation the vision with + 2.50 D. was $\frac{15}{\infty}$. The face immediately became suffused and the ophthalmoscope showed the arteries of the disk larger and small branches, before invisible or nearly so, were easily seen. The vision was tested within a few minutes after inhalation and was found to be $\frac{15}{xxx}$ with difficulty. Twenty minutes later the retinal vessels had returned to their former condition, but the vision was, if anything, a trifle clearer.

September 28. Vision rather better than $\frac{15}{\infty}$. Four minutes after beginning inhalation vision became $\frac{15}{lxx}$, $\frac{15}{L}$, and ten minutes later $\frac{15}{xxx}$?, but did not improve beyond this.

September 29. Before inhalation one letter of $\frac{15}{xxx}$; afterwards better.

September 30. Before inhalation $\frac{15}{xl}$ and $\frac{15}{xxx}$?; after, $\frac{15}{xxx}$.

October 2. Before inhalation $\frac{15}{xxx}$?; after, one letter of $\frac{15}{xx}$.

The inhalations were continued daily until the head symptoms became so disagreeable that it was thought best to discontinue them for a time, especially as the vision remained at $\frac{18}{xxx}$. He was then advised to take up the strychnine, which had in the meantime been left off. The vision remains at $\frac{18}{xxx}$, the disk is white but the atrophy has not increased nor have the blood-vessels become smaller. There was no scotoma, but a concentric narrowing of the field, which did not change materially after the inhalations of the drug.

REMARKS.—It is a well-known fact that nitrite of amyl causes a rapid improvement in vision in cases of tobacco poisoning, but the improvement is followed by almost as rapid a diminution. This case does not seem to have been due to the use of tobacco and alcohol, because only one eye was affected and there was no central scotoma or red blindness. Even if tobacco and alcohol were the causes the rapid and lasting improvement after the inhalations of nitrite of amyl, when no improvement (but gradual diminution) of vision had followed the use of iodide of potassium and strychnine, is exceedingly interesting.

THE ETIOLOGY, PROGNOSIS AND TREATMENT OF EXOPHTHALMIC GOITRE.¹

BY J. FRED. CLARKE, M.D., FAIRFIELD, IOWA.

THE author had sent letters of inquiry to all the counties of Iowa and had collected 49 cases of Graves' disease. These were tabulated and showed the following points of interest:

- (1) As to sex, 36 were females and one male. Of the 12 remaining all were probably females.
- (2) The age ranged from 15 to 45 years. The greatest number in one decade being from 20 to 30 years of age.
- (3) There was exophthalmos in all but one case, and in one case only was the exophthalmos unilateral. In two cases

¹Prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

the right eye was more prominent and in two cases the left protruded more.

(4) The thyroid was enlarged in all cases. In 9 cases the right lobe was larger than the left and in but one case was the left the larger.

(5) The pulse rate varied from 96 to 180. In but one case was there an organic lesion.

(6) The reported etiology was: Unknown, 22 cases; anxiety and grief, 11 cases; heredity, 5 cases; fright, 3 cases. Overstudy, exhaustion from disease, masturbation and ovarian and uterine disease were reported as less frequent causes.

(7) The treatment varied widely. Rest, strophanthus, digitalis, ergot, belladonna, strychnia, iodine, electricity, nuclein and thyroid extract were all used. Thyroid extract, strophanthus and rest seemed to be the most successful.

(8) As to the result of the 49 cases, 18 were cured, 16 improved. There were 5 deaths from the disease and 3 from intercurrent disease.

(9) The disease is rare in Iowa. After much correspondence but 65 cases were found and of these but 49 with sufficient data to tabulate. One physician in forty-five years and one in twenty-two years had not seen a case. The greatest number found in any one locality was six. Of the cases reported the majority occurred from 1892 to 1895.

SCOPOLAMINE HYDROBROMATE AS A MYDRI- ATIC AND CYCLOPLEGIC.¹

BY WILLIAM S. FOWLER, M.D., CHICAGO.

OVER two years ago my attention was called to scopolamine hydrobromate as a cycloplegic and mydriatic, and accepting the statement of the manufacturing chemist Merck, that this agent was ten times more powerful than atropia, my first experiments in its use were made with a one-tenth of one per cent. aqueous solution. When this preparation was

¹ Abstract of a paper prepared for the Second Annual Meeting of the Western Ophthalmological, Otological, Laryngological and Rhinological Association, held in St. Louis, April 8-9, 1897.

used as I had been accustomed to use atropia in one per cent. solution (a drop in each eye three times a day for three days), a perfectly satisfactory result was obtained, absolute cycloplegia and complete mydriasis; but the toxic effect of the drug was so marked and the unpleasant and disagreeable symptoms so general that a weaker solution was resorted to; even this was objectionable, the more susceptible individuals showing rapid pulse, dryness of throat, nausea, great weakness, cyanosis of moderate degree with mild delirium, and later, continued nausea; no treatment other than stimulants were necessary. After various reduced solutions had been employed the one-twentieth of one per cent. solution was selected as the standard for practical use in determining the total ametropia in all refractive cases, other proportions being reserved for treatment of diseased conditions and to inaugurate cycloplegia preparatory to the use of some other agent.

In the course of the experiments leading to the conclusions arrived at it was found that one drop of the one-tenth of one per cent. solution would produce mydriasis in about 25 or 30 minutes retaining it *ad maximum* for about 24 hours, the pupil being restored to its normal diameter in from 60 to 80 hours. Cycloplegia was produced in about 40 minutes, retained to full extent from 20 to 30 hours passing off in from 70 to 100 hours, the susceptibility of the individual varying greatly in the length of time the muscle was controlled by the drug; one case required 6 days to re-establish the accommodation function. Much less variation was found in using the one-twentieth of one per cent. solution, but little longer time being required to realize the full action of the solution, and although careful tests were made no increase in intra-ocular tension could be discovered after prolonged use of this strength, neither was there any disturbance of the conjunctiva after the first day and that was too slight to either cause inconvenience or merit mention.

This preparation, one-twentieth of one per cent. solution, has been used in over 600 refractive cases with more freedom than any similar drug in my hands with absolutely no constitutional disturbances, the patients being directed to place one drop in the outer canthi every 15 minutes for one hour (four applications) and return for examination within two hours of the last application. Nursing mothers when using this solu-

tion have failed to discover any untoward symptoms in their nursling.

In diseases or wounds where prompt cycloplegia or mydriasis, or both, has been desired, the one-tenth of one per cent. solution have been used at first, followed by the usual atropine solutions when permanency of action was required.

Comparing the action of the two drugs in a case of iritis, when the patient was in delirium from pain, scopolamine hydrobromate one-tenth of one per cent. solution was dropped in one eye and atropia sulphate, four per cent. solution, in the other, the canaliculi being compressed and the drops being placed in the outer canthi; these drops were repeated every 15 minutes for three applications. At the end of 20 minutes the pupil under scopolamine had become fully dilated, while the one under atropine was not fully dilated, even with this unusual strength of four per cent. at the end of the hour.

When mydriasis alone is required for the purpose of thoroughly examining the fundus and internal media of the globe, one-fortieth or even one-eightieth of one per cent. will produce the result with a minimum amount of inconvenience to the patient, although if the one-twentieth of one per cent. be used a solution of eserine of one-fortieth of one per cent. will hasten the return of the pupil to its normal diameter.

I take pleasure in noting that the results of my experiments agree closely, both as to strength of solution to be used and in the effects noted with those of Dr. Hobbs, of Atlanta, and Dr. Oliver, of Philadelphia, who have already made known their satisfactory results from the use of this comparatively new drug.

In conclusion, the promptness with which complete paralysis of the ciliary muscle can be produced with associated mydriasis and the comparatively rapid return of the parts affected, to their normal condition, together with complete absence of constitutional effects, render the use of this drug most desirable for refraction work when the total ametropia is to be measured, but after cycloplegia and mydriasis have been inaugurated other agents may be better employed if greater permanency of the condition is to be maintained.

THE AMERICAN JOURNAL OF
OPHTHALMOLOGY.

VOL. XIV.

DECEMBER, 1897.

NO. 12.

ORIGINAL ARTICLES.

THE EFFECT OF INTENSE FLASHES OF ELECTRIC LIGHT UPON THE EYE.

BY DUNBAR ROY A.B., M.D., ATLANTA, GA.,

PROFESSOR OF OPHTHALMOLOGY IN SOUTHERN MEDICAL COLLEGE.

WHILE the cases here reported occurred in my practice more than a year ago, they were recently recalled to my mind by reading Prof. Haab's article in the July number of *Klin. Monatsblt. für Augenheilkunde*, entitled "Traumatic Macula Changes Produced by Electric Currents." There have been perhaps more cases observed than have been reported of temporary injury to the eye through intense electric flashes, but the rarity of such reports warrants the present presentation which will at all events call attention to some of the lurking dangers of the electric lights.

CASE I.—Mr. E., aged 29 years, one of the chief superintendents for the city electric light company, consulted me in my office at 1 P.M., May 20, 1895. The history given was that about one hour previous, while trying to adjust some wires, two of them became crossed a short distance in front of his eyes with the result of a blinding flash of light. For a few minutes his vision disappeared, but gradually returned, leaving only a marked burning irritation in his eyes, the reason for the present consultation.

On examining both eyes, a marked pink zone of injected blood-vessel could be seen around the cornea. The conjunctiva of the lids was but slightly irritated. Pupils react normally to both light and accommodation. Vision in both eyes normal. He complained of only a smarting sensation about the lids and a slight amount of photophobia. The use of dark glasses, hot fomentations to the eyes and absolute rest for a few days was the only treatment advised. About 2 o'clock that night a telephone message was received saying that Mr. E. was suffering so much pain with his eyes that he desired me to come out immediately to his house. On arriving I found the eyes a little more congested than on the previous examination. He was then suffering with violent, aching pains in the eyeball. On a close examination of the cornea this was found to look a little hazy, a condition which was not present at the office examination. There was marked photophobia. Several drops of a 2 per cent. solution of cocaine were instilled into the eyes and also a drop of a weak atropine solution. In about fifteen minutes the patient was perfectly easy and reported next morning at the office that he had remained so all night and was even now perfectly comfortable. On examination the cornea was clear and all signs of irritation had subsided. His eyes rapidly returned to their normal state. No changes could be seen with the ophthalmoscope, although the symptoms pointed to decided retinal irritation.

CASE 2.—Mr. M., aged 18 years, also an employee of the Georgia Electric Light Company. The history of this young man was almost identical with Case 1, with the exception that he was not seen until two days after the injury. An identical electric flash took place just in front of his eyes and he was also blinded for a few minutes. On recovering from the shock he bathed his eyes in cold water and with the exception of a slight irritation he experienced no discomfort. This irritation persisting, the Company sent him to me for examination.

R. E., V.=²⁰/_{xxx}. Improved by no glass. L. E., V.=²⁰/_{xx}. Decided ciliary injection in the right eye and very slight in the left. Pupils react normally but appear rather contracted. The cornea of the right eye appeared a little hazy. By ophthalmoscopic examination I must acknowledge that nothing very abnormal could be discovered, although the region of the macula in the right eye may have looked a little cloudy. Neither in

this case nor in the first was any scotoma or contraction of the visual field to be found. The patient was ordered to wear dark glasses, use hot fomentations to the eyes and a drop of atropine solution was instilled into both. He had no further trouble and vision in both eyes became normal. The flash of light in both cases came from wires which carry a voltage of five hundred.

A few cases have been reported where intense electric flashes have caused a temporary blindness and where the pathologic lesion has been a grayish discoloration in the region of the macula lutea. The action of the snow upon the eyes producing the phenomenon known as "snow-blindness" is of no infrequent occurrence in the frigid zones and the pathologic conditions there found are quite similar to those seen in eyes which have been injured by electric flashes.

The subject of pathologic changes in the macula lutea due to traumatic causes was first given prominence in an article by Prof. Haab, of Zürich, at the Seventh International Ophthalmological Congress, held at Heidelberg. Since that time Prof. Haab and his associates have continued to study the subject and given at intervals further contributions relating to these traumatic changes.

In 1889, E. Meyer, of Zürich, delivered an inaugural address upon this subject, and in 1896, A. Siegfried of the same city, and out of the same clinic, published an extensive article upon "The Traumatic Changes in the Macula Lutea of the Retina."

Intense light as the cause of retinal and conjunctival changes has been known to careful observers for a long time. Electric light as a cause is of comparatively recent date and only since it has become so universally popular for domestic use. One has but to note the dazzling effect produced upon the eyes by the bright reflection from the snow or the same effect produced when we gaze unaided by tinted glasses upon the sun in partial eclipse to realize how irritating and blinding such lights are to our visual members. "Snow-blindness" has been known to ophthalmologists for years as also the blinding effect of the bright sunlight upon the eyes. A very interesting discussion of this latter subject with an abstract of all reported cases can be found in an article by Mackaye published in the *Ophthalmic Review*. He found that after exposure of the eyes

to the sunlight the patients notice a dark spot in the field of vision. This on examination is found to be a positive scotoma which lasts for a certain period of time and then passes away. Mackaye found that this also represented color-sciotomata extending over a larger area. Such patients will often see objects twisted producing the condition known as metamorphopsia. The ophthalmoscope will sometimes show no changes while in others a decided hazy condition will be found in and around the macula occasionally with an accompanying pigmentation. Vision as a rule is reduced and when this is marked a perfect recovery rarely takes place. Pigmentation of the retina caused by the action of sunlight has been adduced by Monoyer as a cause for the condition known as "retinitis pigmentosa."

Deutschmann has shown by experiment that concentration of direct rays of sunlight upon the retina of a rabbit produces a coagulation of the retinal albumen with an accompanying pigmentation. However such an analogous condition could not be attributed to the sun. While the action of sunlight from the snow produces a decided retinal irritation it manifests its chief symptoms upon the eye by producing a severe conjunctivitis with sometimes a diffuse keratitis and ulcers of the cornea. It rarely leaves any bad results.

The effect of bright electric lights upon the eye has also been investigated and the result noted. Just what degree of brilliancy it takes to produce injurious effects upon the eye has not been definitely settled. It is true that the ordinary incandescent light certainly seems to be the best for illuminating purposes. It is more brilliant, produces less heat and therefore less particles of combustion, is steadier than gas and is the nearest approach perhaps to the daily sunlight. However, I must say that experience in the use of both the incandescent light and the Welsbach gaslight has influenced me in a preference for the latter. Of course the latter is more troublesome to keep and therefore has its disadvantages but when subdued by the use of white shades it certainly makes a most excellent light by which to work. Personally I have used this light for years and now prefer no other.

Hartridge, of London, in an article published in the *British Medical Journal*, 1892, on "The Effect of Electric Light Upon the Eyes," states that no bad results have ever been ob-

served upon the eyes from the ordinary use of the incandescent light. Although since that publication I have seen no other reports to the contrary, personal observation prevents me from agreeing with the author referred to. A case recently under my observation could be attributed to no other cause:

Mr. H., aged 24 years, night clerk in a hotel, consulted me last February on account of a slight irritation in his left eye. History was as follows: Physically he was a perfect specimen of manhood. He worked every night as clerk and book-keeper under the constant glare of the incandescent electric lights and slept during the day. Up to this time he had never had the least trouble with his eyes. Gave absolutely no history of syphilis nor could any signs be found on the closest physical examination. He had never been sick a day in his life nor had he ever had the slightest touch of rheumatism. Had never felt better than at the present.

On examination, left eye showed contracted pupil but no more than the right. It did not respond to light. There was only the faintest circumcorneal zone of congestion. Vision normal but photophobia was present. Right eye was normal. On using atropine in the left eye an incipient iritis was readily diagnosed. It was impossible to dilate the pupil *ad maximum*, although there seemed to be no points of adhesion. The iritic muscles appeared perfectly torpid.

The case proved to be one of prolonged treatment, although at no time were the objective or subjective symptoms severe. Nothing was used but atropine solutions, hot fomentations and blisters to the temple. Leeches finally produced a most rapid amelioration of the symptoms. In this case there was no doubt to my mind that the cause of the attack must be attributed to the electric light. He worked for hours every night with an incandescent drop-light just in front and to the left so that for hours there was a constant glimmer especially in the left eye. There was never any trouble with the right eye. Since that time he has had no further trouble as he was transferred after recovery to day duty.

In the last few years there have been a number of young ladies under my care for ocular troubles who were boarding in a large school where incandescent lights were used. I have had to stop some of them from school and in other cases I have substituted a student's lamp in place of the electric

lights with the most happy results. My experience has been that these incandescent electric lights are not suited for a light by which to do constant work.

Hewet, in the *British Medical Journal*, 1893, calls attention to a condition of the eye designated as *electric ophthalmia*. The symptoms of this disease are said to be the same as those of snow-blindness, viz., swollen lids and congested conjunctivæ, later followed by a muco-purulent discharge. This condition is usually found among those employed in electric welding operations, less frequently in those who use the arc lights.

Several cases have been reported of blinding or dazzling of the retina through intense flashes of lightning which show much similarity to those caused by electricity.

Prof. Haab, of Zürich, was one of the first to call attention to changes in the retina especially in and around the macula region from traumatic and constitutional causes in an article read before the Seventh International Ophthalmological Congress at Heidelberg, 1888, and in 1889 E. Meyer from the same clinic continued the study of the subject. These two writers discussed more in detail the vulnerability of the macula region to various causes rather than to any particular traumatic cause. Their subsequent writings seem more of a clinical demonstration of their views previously set forth.

In 1894, Dr. E. C. Rivers published a very interesting case in *Knapp's Archives* on "Injury to the Eyes From Heavy Charge of Electricity." This case condensed is as follows: H. E., aged 25 years, employed as engineer in the motor house of the Denver Electric Car Co., accidentally made a short circuit with a steel wrench in his hand causing the full 550 volts to pass through his arm and out at the wrench accompanied by a loud report and a very intense flash. The patient was stunned and immediately had severe pain in his eyes.

Rivers saw the patient one hour after the accident and found the following condition present: Face with eyebrows and lids, neck, and hand badly burned. On examining the eyes the conjunctiva was found strongly congested and the cornea of both eyes almost opaque. Vision = perception of light. Under the use of atropine, castor oil and dry aseptic cloths, the eyes progressed well.

On the third day the whole eschar on the cornea was

thrown off and this being only the epithelial membrane the remainder was left clear. A few days later, L. E., V.=²⁰/_{XL}; R. E., V.=²⁰/_{CC}. The ophthalmoscope showed the media clear. The retina in the right eye looked hazy. Visual fields normal for all colors. Six months later the patient reported that he still suffered with photophobia and has to wear colored glasses. Is compelled to look very intently in order to see small objects. In my own cases the flash was not near enough to produce burning of the tissues.

Dr. L. D. Broose, of Evansville, Ind., has reported two cases of retinal irritation from electric flashes which correspond more in detail with my own:

J. H., aged 28 years, an employe of an electric street railroad, accidentally received a shock from one of the trolley wires and at the same time the eyes were subjected to a very intense flash of light. When seen five hours later the conjunctival vessels were found injected, the eyes suffused with tears, pupils contracted and patient suffering with intense pain. None of the parts were burned. Patient was directed to stay in a darkened room and a 2 per cent. solution of cocaine was used in both eyes. In twenty-four hours he was able to resume work.

F. W., aged 24 years, also an employee of an electric street railroad, struck a live wire with a file which he held in his hand and immediately there was an intense flash and the patient rendered unconscious, this latter condition persisting but for a short time. When seen a few hours later the patient was complaining of severe pain in his eyes. The ball and lids were found markedly congested. Pupils contracted. Treated in the same manner as the first patient and in five days the patient was able to resume work. The ophthalmoscope showed nothing abnormal. No mention was made of the field of vision.

In the Transactions of the American Ophthalmological Society for 1896, Oliver has reported a very interesting case of traumatic injury to the retina from a severe flash of lightning. This is somewhat similar to Haab's recently published case.

Oliver's case was as follows: A man, aged 20 years, who was being treated for asthenopia at the clinic, while crossing the street one day during a thunder storm was suddenly blinded by a flash of lightning which seemed to strike the earth just in front of him. For a few seconds he was com-

pletely blind, but in about two minutes the sight returned first in the left and then in the right eye. On the next day while at his work (copper engraver) he noticed at his fixation point a small, round, cloudy and grey spot, moving around with his eyes. This central scotoma changed its form into various phantastic figures. At first this was only in the right eye, but eleven days later it appeared in the left with the same moving forms. Four months later the central positive scotoma in the right eye was unnoticeable but the vision remained disturbed, being only one-half. In the left there remained a very small, central spot, not movable, but the vision was normal since the scotoma was a little beneath the fixation point. In about one and a half years these disturbances had reached their minimum. The ophthalmoscope nine days after the accident showed the following: R. E., in the macular region the retina in a circle appeared to be swollen. The tissue itself appeared neither changed in color nor opaque but here and there was an appearance as if a very thin layer of jelly had been placed beneath the retina. Nowhere were there hæmorrhages or signs of degeneration. The discs on both sides appeared a little more indistinct and grayish than the eye of the patient would indicate. In the left eye the macular region at that time appeared normal. It showed, four months after the accident, somewhat under the middle, a small hæmorrhage between the retina and choroid, and about eight months after the accident similar changes were present as in the more affected right eye namely, an irregular spot about half the size of the disc bordered by a bright rim, while in the right eye a similar bordered spot was seen of about double the size of the disc and pigmented.

Prof. Haab in commenting upon this case of Oliver's calls attention to the fact that neither in this case nor in the one reported by himself were there any signs of opacity of the lens.

In individuals struck by lightning cataracts are known to have formed as a result of this injury. This subject has been well studied by Prof. Hess, of Marburg, who has made experimental investigations regarding not only this but also other forms of cataract.

Prof. Haab, in the July number of the *Monatsb. f. Augenheilkunde*, discusses anew this subject and reports another case whose clinical study presents some features of interest. As

this article has not appeared in English I will take the liberty here of making an abstract of the report:

H. W., aged 34 years, machinist consulted Prof. Haab on August 9, 1895, concerning his eye which has received a flash of light from a dynamo of about 60 ampères. He came the same morning immediately after the injury because of the dimness of vision noticed, especially in the lower field. He was stunned by the flash of light which was very near the eyes and for a few movements he could see nothing. The right eye being nearer to the dynamo than the left it was the most affected. The pain was severe in both, just as if needles were sticking them.

Examination: There was only a slight irritation with some hyperæmia of the conjunctiva in right eye. Both pupils contracted, the right more than the left. The irides appeared normal. R. E., V.= $\frac{3}{xviii}$; no improvement with glasses; R. E., V.=Normal. The ophthalmoscope showed nothing abnormal. On the next day the condition was decidedly better. R. E., V.= $\frac{3}{x}$ w. — 0.5 D.= $\frac{3}{vi}$. On dilating the pupil the left eye showed nothing abnormal. In the right eye a very interesting condition was present:

1. Extending over the whole macular region there was a very fine milky discoloration so that the normal granular appearance was absent. In the deepest part of the macular center the discoloration was slightly less. A similar milky discoloration was nowhere else present in the retina.

2. Running along the periphery of the retina could be seen a few yellowish-white spots of irregular form and size about once or twice as broad as a large branch of the central artery. * * * Some spots existed also below the fovea, the latter being quite fine. In the middle of the fovea two very small bright specks were found. Whether these small spots were in the retina or in the pigment epithelium could not be determined. However they were nowhere as white as those found in diabetes or albuminuria. Along the retinal vessels and on the papilla nothing abnormal could be seen. The lens and vitreous were normal. The treatment consisted in absolute rest and the wearing of dark glasses.

August 16. R. E., V.= $\frac{3}{vi}$ w. + 1 D; L. E., V.=normal. The macula is still slightly opaque.

October 13. The eye appeared normal. No signs of cataract.

These cases as well as the subject itself are of interest to the ophthalmologist as affording clinical data upon which to base a prognosis whenever such accidents should come under his own professional care. Since electricity has become so universal in domestic use accidents referable to it as a cause will necessarily be more common. The prognosis in all diseased conditions is determined by clinical experience and hence the greater the number of cases reported the more certainty there is for a basis of deduction. The writer of this article does not lay claim to any original investigation but purposed to bring forth from others their own personal experience. In the study of the cases above reported there are many points of interest involved and chief among them as to whether the changes produced in the eyes had a chemical or a traumatic basis. This point certainly opens up an interesting field for investigation.

Another point to be noted was the universal presence of two symptoms in all the cases, viz.:

1. The contraction of the pupil from the retinal irritation which was so strong that this contraction persisted for days.
2. The pain, which always came on several hours after the accident.

CAN WE PREVENT COLOR-BLINDNESS BY EDUCATION OF THE COLOR-SENSE IN INFANCY?

BY L. R. CULBERTSON, M.D., ZANESVILLE, OHIO,

OCULIST TO U. S. PENSION BUREAU, CITY HOSPITAL, ETC.

THE reading of an article in the *Pittsburg Dispatch* of October 10, led me to the above query. The article was written by the noted correspondent, Frank G. Carpenter, in an interview with the scientist, Prof. E. L. Gates, Director of the Laboratory of Psychology and Psychurgy, Washington, D. C. I copy from his article that portion which bears on the above subject:

“He was much interested in his story of how he first came

to the conclusion that our brains could be added to and built up. When he was a boy he realized that the mind was the most important thing in the universe. At the age of 14, he says, he began to experiment upon himself.

KEEPING A PERSONAL RECORD.

"For two years he kept a record of all that he saw, felt and did. He had a book in which he recorded four times each day just what the climatic and other conditions about him were. In another column he put down his physical condition, stating just how he felt, measuring just how much he ate, and, in short, all that he did that would affect his physical state. In the third column he recorded his mental conditions. At the end of two years he went over the record and generalized it. He found that under certain conditions his brain was more active than under others, that he could write better at such times and that his inventive faculties were more active. After this he worked only under such conditions, and found that he could produce twelve times as good results as before. He soon began to see that his work was getting better and better, and later on began a systematic study of the brain development.

"One of the first experiments was as to the building the brain of a dog. Said he: I wanted to see what effect mental activity has upon the brain, and it struck me, if I could take a certain number of puppies and keep them from their birth in absolute darkness, and at the same time take another set which should be trained in seeing and have plenty of light, that upon comparing the brains of the two I could tell whether the use of the seeing power had changed them. This I did.

EXPERIMENTING WITH PUPPIES.

"I took seven shepherd puppies and kept them in a room until they were nine months old. The room was completely dark. It had triple doors, so that the mother could go in and out without allowing the light to enter the room. When the front door was open and the mother was let in, the doors were closed behind her and she was allowed to remain there some minutes. Then the second door was opened and she was kept there a few minutes, and then allowed to go into the room where her children were. I kept the puppies there for nine months

without light, and then killed them by the use of chloroform. I took out their brains, eyes and spinal chords, and put them aside for microscopic and chemical examination. At the same time I had another group of puppies which I allowed to lead the life of the ordinary dog, giving them no special attention. I chloroformed them when they were nine months old and preserved their brains for examination.

"In addition to these two I had a third group of the same kind of puppies which I put through a course of training in seeing. I had one of the rooms of my laboratory covered with squares of metal, each square being insulated from the other. To some of the squares I attached an electric battery and arranged them so that the moment a dog touched one of them he would receive a shock.

DOGS COULD DISTINGUISH COLORS.

"These squares had one color. The other squares, which were not affected by the electricity, had another color. I soon taught the dogs to discriminate between the squares by the colors, and in this way actually taught them to know colors. For instance, I had one pan or pen the bottom of which was covered with tin painted white. Around this I ran a black border of metal, which was connected with the battery. After a few days you could not get the dogs to touch that border or anything black, but you might lay a white strip across the black, and they would walk over it.

"I also taught them colors by feeding them, placing the meat under pans of a certain color, scattered about among pans of other colors. All of the pans were rubbed with meat first to prevent the dogs from picking out those with the meat under them by the sense of smell. The dogs would go to the right colored pans every time. After awhile I changed the meats to different colored pans on different mornings. The dogs soon learned to recognize the change, and there was one of the dogs who would turn over all the pans until he came to the first one having meat in it, and after that he would turn over only pans of that color. The dogs, in fact, learned to surpass many of our artists in their discrimination of colors. They could distinguish seven shades of red and about eight of green.

EFFECT UPON THE BRAINS.

"Well, at the end of nine months I killed this set of dogs, and then compared the brains of the three sets. I found that the dogs who had been kept in darkness had no brain-cells in the seeing areas of their brains. The dogs that had been allowed to run about had well-developed brain-cells, just as you will find in the ordinary dog of that age. But I also found that my trained puppies had a much greater number of such cells, and that their cells were more highly developed. I found, in short, that by educating the dogs I had added to their brains. I tried the same thing on other dogs as to hearing and also as to training of the muscles by making the dogs produce certain leg motions, and found that this produced similar results on the brain. I practiced similar experiments upon monkeys and rabbits as to colors, and I made a large number of experiments upon guinea-pigs, running through several generations, to see the effect of heredity upon brain development. The result is that I have no doubt but that man can not only develop the brains he has, but that he can actually add to them and build up new brains along such lines as he desires."

"Have you evidence that any such work would readily affect the brain of a human being?"

THE PROFESSOR'S BRIGHT BABY.

"Yes, I have tested it in many ways. I have a baby, for instance, who will discriminate more than a hundred thousand different shades of color, and who has been specially trained in seeing, feeling and in other ways. I believe that we have eight senses, you know, instead of five. We see, we hear, we smell, we taste, we touch. We also have a sense of cold and a sense of heat, and also a sense of muscular action. All of these senses are based upon thought. They are controlled by the mind. The use of them acts upon the mind. Every time you use one of them a certain set of cells in the brain is changed, and by their use you can build up a new set of brain cells. Unless all of these senses are used your brain will be unevenly developed, and some parts of it will not be developed at all. In training my child I

tried to make him use all of his senses. I taught him the senses of heat and cold by the use of hot and cold baths, graduated from cool to warm. I also used rubber gloves, connected with the water supply, and, as a result of this, I believe his brain will be stored with memories of all the degrees of heat and cold he is likely to have in life, and I think he will be able to endure the differences of temperature. He is now two and a half years old, and he has never been sick but once and then he had the measles.

"Prof. Gates showed me the boxes of blocks with which he taught his child the different geometrical shapes. He has whistles with which he taught him sound, so that he can now distinguish scores of different pitches. He has bottles containing different liquids, each having a different smell. These bottles number 1,500, so that he may really be said to have 1,500 different smells bottled up. His baby at ten months could distinguish 50 different tastes and 30 different smells. While we were talking the baby came into the laboratory with his nurse. He looked to me as happy and healthy as any child could be.

LESSONS ARE VERY BRIEF.

"Prof. Gates tells me that his experiments in teaching him never last more than five minutes at times, and that the child really likes them. He also said that a child who had been trained for six weeks after birth in the excessive use of the heat and cold senses was found, after dying of scarlet fever, to have in the temperature areas of the brain more than twenty-times the average number of cells.

"I asked Prof. Gates when brain building should begin.

"He replied that it should really begin in the father and mother before the child was born, and that the child within a week after birth should begin its brain development.

"Prof. Gates says that his experiments show that men can really work their brains over and make them new. They can rebuild them, and can make them do original thinking for them along any line that they choose. I had my photographer with me during my call at the laboratory. Prof. Gates pointed to him and said: 'I can take that man, and, within a year, if he will follow out my directions, I can have him making new discoveries and inventions in photography. I would first teach

him how to control his mind and how to use it in the direction of his work. I would gradually lead him to original thinking, invention and discovery. I would have him to take the sum of accurate human knowledge in photography and would teach him how to work from that on through to new ideas. He would first exercise everyone of his thirty or forty mental functions upon each proposition of the science. This would keep each faculty active for a certain number of hours every day. The parts of his brain which he needed to deal with the subject would grow, his sub-conscious functions would become stimulated, and new ideas would dawn upon him.'

QUADRUPLING THE MENTAL POWER.

"I have found that six months' practice along the lines which I lay down usually quadruples the mental capacity of a man, and more than quadruples the number of ideas gained each day. Of course, such ideas have to be tested by observation and experiment as to their correctness. Take this microscope, for instance. The wonderful thing about it is not the discovery, but it is the art of mind-using and mind-building which I have used which has resulted in the discovery."

* * *

The above has opened a new field for thought and study, *i. e.*, as to whether color-blindness can not be overcome by education of the color-sense. Authors state that 5 per cent. of the population are color-blind. What a boon to humanity if this could be reduced to even 2 per cent. Ophthalmologists see daily the disappointment of men who desire to follow a certain occupation but are debarred from doing so because nature has given them a defective color sense.

Following Prof. Gates' line of thought I would suggest that ophthalmologists experiment on cultivation of the color-sense of children of color-blind parents and endeavor to develop the color-perceiving brain centers. I would also suggest that parents be instructed by competent physicians or oculists in the use of Holmgren wools or other color tests and let them daily educate their children in matching and recognizing colors. A good method would be to have duplicates of the different shades and if the children are old enough to understand, tell them to find the mates and then tell them to name the

shade. The name through the association of ideas will assist to fix the color in their memory. Further experiment will teach us the best method of educating the color-sense.

The kindergarden would be an excellent place for instruction, or the primary grades of public schools. Probably difficulty will be encountered in color blind children who will put confusion colors with certain shades.

I would suggest an experiment that might teach us how to overcome this. Ascertain the color which confuses the child. Say it is green-blind. Then take blocks of wood and coat them with sand and glue or sand-paper. Let the sand be coarse. Then paint the various shades of green on the different blocks over the sand. Then have another set of blocks on which is a finer grade of sand. Paint these the various shades of drab. If the subject be red-green-blind—I mean if they call red, green—also have another set with still coarser sand thereon, painted the different shades of red. Then give the subject a green block and tell him to match it. He will put a drab with it. Then tell him to feel it and ascertain if it *feels* like the other color. He will say no. Then tell him to pick out from the other set one that *feels* like the one he has. He may not get the same shade but he will not confuse the color as he is partly or wholly guided by the sense of touch. (The blind can tell colors by the sense of touch). Now at the same time that the touch perceives that the green block feels coarser than the drab, the *neuron* or nerve-cell for the sight-perception of green will have another cell (or idea) to guide and reason with it through the sense of touch thus showing its color. In this manner a new cell will form or be developed which will be connected with the cell which perceives the green shade through touch and the cell which perceives the green shade through sight. The grey-perceiving cell will then respond to the different light-wave length of grey, and grey be perceived as grey. When the grey-perceiving cell has become fully developed it will not need the touch to assist it.

Another assistance might be to have toy animals of different colors. Say we have cats painted different shades of green and dogs different shades of grey, and if red-green-blind, cows of different shades of red. Then mix all animals together and have them assort them. This would assist them through the

form-sense but would be of more benefit after the color had been acquired through the colored sand-block exercise.

I do not say that color-blind children can be taught colors by the above theory. I merely offer the above as a suggestion for experiment by some of our ophthalmologists and others.

The question is one of the deepest interest to us as well as to suffering humanity. If it can be solved it will enable many a man or woman to attain eminence in a trade or profession from which they would be debarred if color-blind.

The same line of reasoning may lead to the discovery of a method to teach children whereby tone-blindness (deafness to pitch of tones or "false ear") may be overcome.

OPERATION INTENDED AS SUBSTITUTE FOR EXTIRPATION OF LACHRYMAL GLAND OR DUCT.

BY JOHN JOHNSON KYLE, M.D., MARION, IND.

RESearch in the past few years into the bacteriological products of the conjunctiva and lachrymal duct has revealed a variety of micro-organisms which are of interest to the ophthalmologist.

It was but yesterday that the nasal, as well as the conjunctival mucous membranes were supposed to be aseptic. To-day we find these mucous membranes covered with micro-organisms which have been classified and their functions partially explained. Prominent among those who have made systematic and painstaking efforts in this direction are Sattler, Michael, Koch, Weeks. While later Professors McFarland and Knies, in "System of Diseases of the Eye," Vol. II, (Norris and Oliver) and likewise Victor Morax and George William Beach, of Paris, have at different times contributed interesting and comprehensive articles upon bacteriology of the conjunctiva. "The bacteriological study is far from being completed," however the ground is sufficiently covered to enable us to diagnose and classify conjunctival inflammation from bacteriological rather than pathological appearance. Occlusion of the duct is due to congenital stricture, extension of a diseased

condition of the mucosa of the nose, or inflammation within the duct itself.

There is no age at which diseases of the lachrymal duct may not occur. The youngest operated upon by me was a babe six weeks of age, the child suffering from dacryocystitis, due to stricture of the duct near the nasal opening. The punctum was slit and a probe passed into the duct. The duct was syringed daily for two weeks, when the little patient made a complete recovery.



In the young the retained secretion may bulge the lachrymal sac and find ready exit through the puncta. In other cases the sac may rupture, forming phlegmonous dacryocystitis. In my experience the disease is usually confined to one side. The puncta and canaliculi are subject to a number of congenital anomalies. For instance, we find a number of small openings into the canaliculi; again we find a slit or one or two openings with a slit or *vice versa*. It is not my purpose to consider the treatment of the different diseases of the sac or duct, other than the consideration of the following operation, which to me is new—if not, my confrères may set me right.

It has been my experience and observation that in many cases of chronic stenosis, even when the probe is passed and the style worn for months or years, upon removal, which patient often demands, there is an immediate occlusion of the duct, and not unlikely, a probe can not be reinserted, or if so,

only with great difficulty. In old chronic cases it is often necessary to perform extirpation of the lachrymal gland. To avoid the radical operation of extirpation of the lachrymal gland, the following operation, performed a number of times by me with good results, I think is simpler, and following a natural course. The lachrymal bone at the junction with the superior maxillary bone is very thin and fragile, and being vascular, is easily passed through. With this in mind the canaliculus is slit and carefully dissected to the osseous opening of the duct as shown in the accompanying figure. Now taking a small Krause trocar, this is passed into the opening making firm pressure downwards and inwards. The trocar thus passes through the lachrymal bone into the nasal cavity under the superior turbinated bone. There is but little hæmorrhage following the operation, which can be done under cocaine. A short silver canula about ten millimeters long, with short narrow lips bent at right angles is now passed into the new opening, and the wound carefully treated until all inflammation has passed away. The advantage of a short tube lies in the fact that we avoid the accumulation around the tube of the thick viscid secretion which is thrown off from the turbinates. This secretion clings in great masses to the tube and makes removal for cleansing very difficult. A short tube remains quite as well in position. Healing readily takes place around about the opening, and the patient has no difficulty in removing and reinserting the tube. This is a great advantage over the old styles worn in the natural duct, in that, as a rule, it requires an oculist to replace the canula after it has been once removed. In old cases of dacryocystitis the epithelial lining of the sac is thoroughly diseased. With a transfer of secretion to a new channel the walls gradually unite from proliferation of epithelial cells, thus completely occluding the old duct. By careful attention to the anatomical structure and a knowledge of any abnormalities of the middle turbinated bone, the operation can be performed without danger of injuring accessory cavities.

CASES FROM THE CLINIC.

BY HENRY DICKSON BRUNS, M.D., NEW ORLEANS, LA.,

PROFESSOR OF DISEASES OF THE EYE, NEW ORLEANS POLYCLINIC; SURGEON-IN-CHARGE OF THE EYE DEPARTMENT, EYE, EAR, NOSE, AND THROAT HOSPITAL, NEW ORLEANS, LA.

DISCUSSION OF PUPILLARY MEMBRANE AND IRIDOTOMY WITH THE GRAEFE KNIFE.

CASE I.—(21198). A white gardener, aged 77 years, whose left eye had been unsuccessfully operated on for cataract in May, 1894, presented himself at the clinic in March, 1895. V., R. E.=l. p., from partial cataract; L. E.=l. p. In the left eye the pupil was occluded and the iris much distorted; so bound down and incorporated into the occluding mass of lymph and capsule as completely to shut off any communication between the anterior and vitreous chambers.

March 6. The left eye being thoroughly cocaineized an iridectomy was done at right angles to the direction of greatest tension of the iris fibers in the following manner: A narrow and sharp Graefe knife was passed through the cornea at its inferior portion about 2 mm. from limbus and its point and about one-third of the blade plunged obliquely through the iris into the vitreous at the point destined to be the upper end of the false pupil; the knife was held perfectly steady and no lateral deviation allowed. This done the knife was rotated carefully around its short axis in such a way as not to enlarge the corneal wound while using it as the fulcrum, pivot or axis of rotation. By this motion the point and portion of the blade passed through the iris was made to cut and carry the tissue of that membrane before it. The handle of the knife traveling towards the forehead had now described more than 100° and the iris was lying crumpled and folded over the blade; then, without changing the direction of the knife and again carefully avoiding any enlargement of the corneal wound, the knife was slowly withdrawn and cut well and clearly through the iris, drawn tense against its keen and slanting edge. A perpendicular slit, about one-sixth of an inch long, at right angles to the

line of iris tension, had now been cut completely through the thickened membrane. This at once expanded into a lanceolate (cat's eye) pupil as the result of the pressure of the vitreous and the retraction of the iris fibers. A little blood escaping from the wounded iris in a few seconds obscured all view of the field of operation and obliterated the momentary vision that had been obtained. Only a trace of aqueous had escaped and the anterior chamber seemed normally full. Atropine was instilled and a protective bandage put on.

March 12. In six days all the blood had been absorbed from the anterior chamber, the false pupil retained its original shape and size, and a clear view of the fundus could be had with the ophthalmoscope. The vision with + 12 s. = $\frac{20}{\infty}$, but the patient old, stupid and a foreigner could not understand or make himself understood. The vision was certainly amply sufficient for all practical purposes.

CASE II.—(26410). White farmer, aged 72 years, who had a cataract extracted from left eye last April, came to the clinic January 15, 1896. He is robust, old, a foreigner and stupid. In the left eye the iris is much distorted and the displaced pupil is blocked with lymph and the remains of the lens capsule. In each eye (he has an almost ripe cataract in the right eye) the V. = l. p. Under cocaine a free dissection of the occluding membrane is made with a Graefe knife by the "somerset" operation above described. Immediately fingers are counted at a foot or more. The iris has been touched by the knife, however, and bleeds freely; in half an hour vision is much obscured by the blood in the anterior chamber. Atropine is instilled and a pressure bandage applied.

January 16. The blood is gone from the anterior chamber and the pupil looks black, but he does not see.

January 17. Faint red reflex from the fundus. Instillations of borax and camphor water are ordered.

January 21. L. E., V. = finger counting at one yard.

March 3. + 8 s. seems to give the best vision, but it is impossible to gather from him exactly what he does and does not see. However, he gets about well with these glasses on and is advised to wear them for three months and then to see if his local optician can improve on them.

CASE III.—(32503). White man, aged 44 years, a clerk by occupation, came to the hospital May 18, 1896. He says

that he has little vision in right eye, which has been failing for the last eight months. He had a cataract extracted from left eye two years ago, but the sight has been failing again for about four months. His general appearance and health are good R. E., V.=1. p.; L. E., V.=²⁰/_c (with glass).

August 6. The pupil of left eye being well dilated under cocaine, the membrane is freely discised with a Graefe knife by the "someset" method. With a glass V.=²⁰/_{xxx}. The iris has not been touched and there is no bleeding.

August 13. L. E., V. w + 11 s.=²⁰/_{xxx}; with + 14 s.=Sn. No. 1.

I am convinced of the superiority of this method of discision in the majority of cases. Loring used the Graefe knife (Noyes' Text-Book), but by thrusting through the cornea and obstruction and sawing; but many cases, particularly when we have to deal with very tenuous membranes, can not be discised in this way. The danger of the "someset" operation is dragging upon the ciliary body and where this is found to be inevitable the method must be abandoned and some other chosen. The possibility of discising occluding membranes with none and of making iridotomies with but very little hæmorrhage or loss of aqueous is of incalculable advantage in these cases. The immediate application of a firm pressure bandage (Fuchs) by retaining the aqueous, increasing the tension and so restraining bleeding, and keeping the vitreous pressed between the lips of the new-made cut does much to ensure a good result.

LEPROUS IRITIS.

CASE I.—(36864). A white man, aged 65 years, a private watchman, came to the hospital March 16, 1897. He describes his general health as poor. The skin of the face has the characteristic, semi-translucent, coppery discoloration and is thickened over the brows, in the ear lobes, and the usual situations. The countenance is leonine, the eyebrows scanty, the lashes gone, the fingers ulcerated. The diagnosis (leprosy) is indubitable. Right eye is red from a marked ciliary injection, the iris looks thick and dull, the pupil is small, unresponsive, bound down; it is rather painful. V., R.=fingers at ten feet; L.=²⁰/_{Lxx}. Atropine is freely instilled and hot applications are ordered. At the end of four or five days there was no change in the condition and the patient ceased to visit the clinic.

CASE II.—(35584). A white man, aged 49 years, a shoemaker, who describes his general health as good but is evidently a leper, applies for treatment December 3, 1896. About a week ago the sight of left eye began to fail with but little pain or redness. Now vision of this eye = counting fingers at four feet; there is moderate ciliary injection and T. = + 1. A strong solution of atropine is repeatedly instilled at the clinic and a mercurial purgative is ordered at bedtime.

December 8. Marked improvement. Atropine is repeatedly instilled at the clinic every day.

December 10. A week after admission he is discharged cured; V., L. E.=³⁰/_{xxx}; Tn.

These cases are described on account of their rarity at most clinics in the United States. The iritis is usually of moderate grade, but there are nearly always persistent posterior synechiæ; the iris is markedly dull-looking and pain is not a conspicuous symptom. Very often the conjunctiva near the cornea is infiltrated with the leprous material and leprous tubercles are not uncommon on the iris. While the first attack is as a rule readily relieved relapses soon occur and the prognosis is absolutely bad; the cornea becomes dull, the conjunctiva dry and atrophic, the iris extensively bound down, the pupil occluded and the lens opaque. I have observed all my cases in the tubercular or mixed tubercular and anæsthetic form, the one usually seen here. This cause of iritis is not mentioned by Noyes (1890), is not in the table of etiology given by Fuchs (1892) p 285, nor by Norris and Oliver (1893).

EPITHELIAL HORN AT TEMPORAL EDGE OF UPPER LID.

CASE I.—(35657). A white man, an Italian, aged 35 years, of good general health, presented himself at the clinic December 9, 1896. He has noticed a growth at the outer edge of his eyelid for two years. This growth is an epithelial horn about one-fourth of an inch long and about the size of a crow-quill at its base tapering to a point. It springs from the skin just above the line of eyelashes and depends slightly. It was removed by a snip of the scissors, a single point of fine suture put in and glutol dusted over the wound.

December 10. There is a little suppuration around the suture; re-dusted with glutol.

December 11. Healing complete; stitch is removed; scar imperceptible.

Not only are horns on the eyelid sufficiently rare—I have observed only one in 12,000 odd cases—but I desire to call attention to the glutol of Schleich as an admirable dressing for slight wounds of the eyelids and neighboring parts. In many small operations such as incision of chalazia, snipping off warts or other benign growths, etc., the insertion of even a single suture is usually more painful and tedious than all the rest of the operation, performed as it may be by a single quick cut or scissors snip. In Schleich's glutol we have an excellent adhesive antiseptic dressing which entirely obviates the necessity of suture in wounds half an inch or less in length. When bleeding has stopped the powder dusted upon the oozing surface forms a firm elevated scab. If this be left absolutely untouched by the patient it will drop off in the course of a day or two leaving a clean linear cicatrix which rapidly becomes almost invisible to the naked eye. Recently I removed by a single snip of the scissors a xanthelasma from the upper eyelid of a lady; the lanceolate raw surface was not quite three-fourths of an inch long by almost one-half of an inch wide. Had I have been obliged to seize the edges of the wound with forceps, make two or more needle punctures and draw through and tie one or two points of suture, not only would I have been obliged to use more than double the time of operation, but I should have greatly added to the alarm and nervous irritation of the patient. Instead, I dusted the surface until a glutol scab about one-fourth of an inch in thickness was formed. This I abjured the patient to refrain from washing or touching and in four days it fell off leaving a fine line of scar that could not have been surpassed by the most accurate coaptation by suture. These minutæ are worth observing particularly in our private practice; the infliction of pain is a constant source of irritation to the sympathetic surgeon.

HYPERPLASIA OF THE SUBCUTANEOUS CONNECTIVE TISSUE OF THE EYELIDS.

CASE I.—(22:33). A mulatto girl, aged 18 years, married, came to the hospital June 8, 1894. V., R. E.=¹⁰/cc; L. E.=²⁰/xl. She says that eleven years ago she had a sore head and lost

her hair, "then all the skin around her mouth got sore, and then the eyes became as they are now." Both eyes are half closed by the drooping upper lids and at a short distance the eyelids and neighboring skin look as though they were very œdematous; the edges of the lids are sore and on eversion of the lids, which is somewhat difficult to perform, conjunctival hyperæmia is noted, which is said to be chronic. Close examination shows that the condition is not due to œdema but to a general hyperplasia of the subcutaneous connective tissue of the lids and neighboring skin. The other parts of the eyes seem to be healthy. The defective vision is due to conical cornea and it is not improved by any combination of glasses. I have never seen a case at all similar, but I believe I have somewhere read a description of one, though just where, I can not now recall.

SYMPATHETIC INFLAMMATION AND IRRITATION.

CASE I.—(23122). A white sailor, aged 32 years, came to the clinic July 27, 1894 V., R. E.=0; L. E.=¹⁰/_{xx}. When a child, more than twenty years ago, a bit of gun-cap penetrated the right eye. For the last ten days it has been red and extremely painful, and there is incipient irritation of the left eye.

August 1. Right eye was enucleated. The piece of gun-cap was found imbedded in a calcareous mass, probably the remains of the lens; the retina stretched like a cord from the papilla to the site of the foreign body and the eye was filled with a bloody fluid.

August 22. He was dismissed entirely relieved.

CASE II.—(23696). A white girl, aged 8 years, was brought to the clinic September 3, 1894. Both eyes totally blind and much disorganized. On February 14, last, about six and a half months ago, she stuck the point of a pocket knife into the ciliary region of the left eye. Two months later the right eye became inflamed and was soon lost.

CASE III.—(23738). White man, aged 53 years, was led into the clinic September 6, 1894. He says that in 1864 a bit of musket-cap flew into his right eye. The left eye remained good until 1890, twenty-six years after the accident, when it began to fail. Now he is absolutely blind in both. In right

eye there is a pigment patch at the outer margin of the iris and the subjacent lens is opaque, the remainder being clear; the left lens is partially opaque. The fundus can not be seen in either eye, there being no reflex even from the left.

CASE IV.—(24614). A negress, aged 39 years, comes to the clinic November 6, 1894, suffering severely from the right eye which she says has been bad for three weeks. There is no wound and she gives no history of injury, but the eye is evidently in a condition of panophthalmitis; V., R. E.=l. p.; L. E.=²⁰/_{xxx}. There is marked sympathetic irritation of left eye. The right lid is everted, the conjunctiva swollen and the cornea destroyed.

November 14. The right eye is enucleated.

November 22. The patient is dismissed entirely relieved; V., R. E.=²⁰/_{xx}.

CASE V.—(24621). A negro shoemaker, aged 51 years, applied for relief November 8, 1894. Twelve days ago he was wounded with a fruit-knife. V., R. E.=²⁰/_{xxx}; L. E.=l. p. There is a cicatrix of the upper and lower lids, the result of a cut which evidently laid open the ciliary region of the left eye. The left eye is inflamed and there is pronounced sympathetic irritation of right eye.

November 14. Left eye was enucleated. Healing progressed without an untoward symptom and the patient was discharged relieved November 23.

CASE VI.—(25328). A negro laborer, aged 24 years, came to the hospital January 3, 1895. His right eye was wounded two years ago, but gave no trouble until two days ago. The eye is injected with a cicatrix of the ciliary region. There is irritation of the other eye. V., R. E.=0; L. E.=²⁰/_L (with atropine).

January 10. Right eye was enucleated and the patient never again returned to the hospital.

DIPHTHERITIC CONJUNCTIVITIS.

CASE I.—D. G., a white child, aged 2 years, was brought to the clinic on March 25, 1897. He was said to have had sore eyes for five days. The child was languid and feverish; he lay back in his mother's arms with his eyes closed noticing nothing. He did not by any means, however, appear very ill.

The lids of the left eye were dusky red and much swollen; on pulling them apart a thin muco-purulent secretion escaped; on everting the upper lid the mucous membrane was found thick, velvety, red. The surface of the palpebral conjunctiva was covered with a thin whitish pellicle, which the physician who took charge of the case tells me, persisted until the deservescence of the disease, re-forming rapidly after any removal. The conjunctiva bled readily. The right eye was blood-shot and watery but not inflamed.

The general symptoms were thought by the parents to be due to the inflammation of the eye, hence the presence of the patient at my clinic. A culture-tube was inoculated with the secretion from the left eye and immediately sent to Dr. P. E. Archinard at the Bacteriological Laboratory. Drops of borax, boracic acid and camphor water were prescribed, to be instilled often enough to keep the eyes perfectly clean.

March 26. A report was received from the bacteriologist that the characteristic bacilli had been found and that the case was therefore one of true diphtheria. I at once communicated this to the mother and advised that the child be inoculated with antitoxin. The Board of Health flagged the house and took the necessary sanitary precautions. On the evening of the same day the child was injected with 1500 units of Mulford & Co.'s (tested by Laboratory) antitoxin by Dr. J. J. Archinard, who informs me that no local treatment was used except the above-mentioned drops and that recovery was complete in six days. In three days the membrane had ceased to reform and the child was discharged practically well.

This was by far the most pronounced case of the disease I have seen here. I reported to the Orleans Parish Medical Society (*New Orleans Medical Journal*, July, 1896) three cases of this disease interesting on account of their exceeding mildness and as demonstrating the efficiency of the antitoxin treatment. For these reasons I believe they will bear repetition. The cases are as follows:

CASE I.—M. A., white female infant, aged 16 months, was brought to my clinic December 27, 1895. She had been unwell for a week with a sudamina-like eruption on skin and eyelid; for three days the left eye has been sore. There is a mild conjunctivitis with a slight watery, mucous secretion, and when the lids are everted they are seen to be covered with the thin,

whitish pellicle not uncommon in catarrhal conjunctivitis. A diagnosis of "conjunctivitis, acute catarrhal (croupous or membranous)" is made, and as a matter of curiosity and extra-clinical caution a diphtheria culture-tube (diphtheria was then prevailing in our city) is inoculated and sent to Dr. P. E. Archinard, the bacteriologist of the State Board of Health. A solution of silver nitrate, five grains to the ounce, is painted on the everted lid and a 1 to 1000 solution of formol ordered dropped frequently into the eye at home. Neither I nor any of my assistants had the slightest suspicion of the diphtheritic nature of the affection.

December 30. Dr. Archinard reports the case one of true diphtheria; the culture has developed an abundance of pure Klebs-Löffler bacilli.

December 31. The next visit of the patient 5 cc. of antitoxin (Dr. Hans Aronson's) are injected subcutaneously.

January 2, 1896. Nothing having been done meanwhile beyond keeping the eye clean with formol solution, there is great improvement. A few drops of a one-half grain to the ounce silver nitrate solution are instilled.

January 4. There are no remains of the membrane (pellicle). Some zinc ointment is ordered for the few eczematous little sores on the face.

January 6. The little sores are almost well. The eye is slightly injected and a few drops of a two-grain to the ounce silver nitrate solution are instilled.

January 20. Twenty-four days since the first observation, the case is practically well; as a precaution it is kept under observation until March 9, when it is discharged cured.

CASE II.—M. C., white female, aged one and a half years, was brought to the clinic February 17, 1896. The eyes have been sore for a day or two and present the appearance of catarrhal conjunctivitis of moderate severity. The lids being everted are found to be lined with a thin pellicle, easily removed, which extends to the bulbar conjunctiva at a few points. There are some minute blister-like spots on the skin of the eyelids and a little sore on the tip of the nose. The temperature is normal, and the child does not look ill.

Case I. having made me suspicious, $2\frac{1}{2}$ cc. of antitoxin (all at hand) are at once injected subcutaneously, and a culture-tube prepared.

February 19. Five cc. of antitoxin subcutaneously. Temperature normal. Dr. Archinard reports true diphtheria; Klebs-Löffler bacilli in the culture.

February 21. No membrane forming; temperature normal.

February 24. Practically well; still some catarrhal inflammation. Seven days since first observation.

March 9. Discharged cured. In this case there was no local treatment other than keeping the eye clean with borax water.

CASE III.—M. M., white female, aged 2 years, was brought to the clinic February 22, 1896. Nine days ago the left eye became inflamed, the inflammation extending to the other eye next day. The picture is one of catarrhal conjunctivitis with moderate muco-purulent secretion. There is some thin, adherent, whitish membrane ("croupous") on the palpebral conjunctiva of each eye. The temperature is normal and the child does not seem ill. Locally, for cleanliness, borax and camphor water drops are ordered to be instilled every half hour and 5 cc. of antitoxin are at once subcutaneously injected.

February 23. Dr. Archinard reports the case to be one of true diphtheria.

February 25. Much improved; little membrane on left eye only.

February 28. Practically well; discharged cured; borax drops to be continued a little while.

It will be seen that in these cases not only were the eye symptoms not to be distinguished by observation alone from those of moderate catarrhal conjunctivitis accompanied by the formation of a trifling and apparently pseudo-croupous membrane, a thing common enough, but the general symptoms of the disease were most conspicuous by their absence. These cases would never have been recognized as diphtheria but for one accidental finding, and I have no doubt that more frequent search would discover a much larger number. Should diphtheria again prevail in our community, I intend, with the assistance of my colleague, Dr. Archinard, who kindly conducted the bacterial research for me, to prosecute such a search and hope to be able to elicit more extensive and exact information; for it is evident that since the discovery of the Klebs-Löffler bacillus and of antitoxin this whole chapter of our knowledge must be re-written. The very important bearing of such cases

on the general welfare of a community is obvious. In the first place they emphasize the perfect reliability of the diphtheria antitoxin as a specific remedy. The most skeptical could not doubt the evidence of this local manifestation of a general disease disappearing under the influence of the subcutaneously injected remedy without local treatment. In the second place, such mild cases of so deadly a disease must be particularly dangerous as sources of infection, and they have doubtless caused many a case the etiology of which has remained shrouded in mystery. It is evident that during the prevalence of diphtheria children with "sore eyes" should be regarded with wholesome suspicion and should be segregated from their companions until the innocence of their affection is proven, particularly as this is now so quickly and readily accomplished by our skilled bacteriologists.

XEROSIS OF THE CONJUNCTIVA.

CASE I.—(36888). A small, very black girl, aged 4 years, is brought to the clinic because "she can't see at night" March 18, 1897. Her general health is said to be fair; she looks scrofulous, has a pustular eruption on temples and neck, and several swollen cervical glands. The mother has much the same general appearance including the glandular enlargement. That portion of the child's bulbar conjunctiva which is exposed in the natural palpebral opening looks as though it were covered with extremely thin and semi-transparent but stiff black silk the surface being marked with innumerable minute greasy dots. All the conjunctiva normally covered by the eyelids is perfectly natural in appearance. The affected part of the membrane is thrown into a great number of very fine vertical folds or wrinkles by every lateral motion of the eyeballs. A small quantity of white foam lies upon the edges of the eyelids.

This disease has been well described by Dr. Kollock, of Charleston, S. C., in the "Transactions of the American Ophthalmological Society," for 1890, who has found it quite common among the negroes of that locality. The present case is noteworthy as the first I have ever seen in this city during a practice of fifteen years including many thousand negro patients. The mother had not observed anything wrong with the child's eyes; she was worried over the hemeralopia only, the

curiously correlated symptom of this condition. Unfortunately the child was too young and dull to permit of measuring the visual acuity. A mercurial salve was applied to the eruption on the neck and temple, and one-forty-eighth of a grain of bi-chloride well diluted ordered to be given once a day. The patient returned once or twice and then, much to my regret, disappeared.

[NOTE.—Since writing the above a second patient with the same disease has presented himself and is now under treatment at the clinic. He is a mulatto boy, about 12 years old, apparently well-nourished. He bleeds frequently from the gums and sometimes from the nose. Hemeralopia is marked although ordinary vision is good.]

ACUTE VISION UNDER EXCEPTIONAL CIRCUMSTANCES.

CASE I.—(25612). A white school boy, aged 9 years, came to the clinic January 28, 1895. Five years ago, he says, he stuck a knife in his left eye. His general health is good. Left eye is destroyed; it is injected and tender and V.=0; right eye normal, except that the pupil is contracted, being not more than one-eighth of an inch in diameter. The upper two-thirds of this small pupil are blocked with exudate leaving a clear space below hardly more than a pin's head in size and yet through this he sees $\frac{20}{x}$ well. This is very remarkable when we consider that the condition is due to a pre-existing iritis, and that, too, an iritis, we must suppose, of sympathetic origin. None of us who saw the eye expected anything but very poor vision of it and yet the above measurement was obtained by several observers. We advised the enucleation of left eye, but it was declined and the patient never returned.

CASE II.—A white woman, aged 25 years, and of good general appearance, presented herself on February 24, 1896, with both eyes red and watery, in which condition she said they had been off and on for two years. The pupils being dilated with atropine and the media proving perfectly clear, choroiditis disseminata was observed; the macula seeming to be involved in extensive atrophic changes at the very center of right eye. The patient stated that she had been treated for the choroidal disease at another clinic six years ago. Vision proved to be $\frac{20}{L}$ R. E., and $\frac{20}{xx}$ L. E., but with + 1 c. ax. 75°

R. E. = $\frac{20}{xv}$ and L. E. with + 1 c. ax. $75^{\circ} = \frac{20}{x.}$, the same holding good under full atropine paralysis. These glasses were ordered. With these she could read Sn. No. 1 readily at the ordinary distance. The vision of the right eye astonished every one who saw the extensive changes in the choroid situated, as I and all my assistants agreed, in the immediate neighborhood of the yellow spot. I have always been inclined to think the perfection of vision for far and near a more reliable and important index of absence of disease of the fundus than inspection with the ophthalmoscope, so numerous are the variations in appearance of the normal fundus that may readily be taken for slight or incipient disease, and such I still believe to be a safe general rule and one capable of saving us from many ridiculous mistakes. This case, however, has put me on my guard and serves to prove that the results (at any rate) of very extensive pathological changes near the very center of the retina are not incompatible with absolute perfection of visual acuity.

BOOKS AND PAMPHLETS.

A COMPARATIVE STUDY OF THE AREA OF ACUTE VISION IN VERTEBRATES. By JAMES ROLLIN SLONAKER. Reprinted from the *Journal of Morphology*, Vol. XIII., No. 3. Boston: Quinn & Co. 1897.

The author has in this pamphlet given us in detail the results of excellent and exhaustive studies concerning the area of acute vision in animals. The text is illustrated by a large number of drawings and especially fine photographic reproductions. We want particularly to draw the attention of our readers to this excellent thesis.

VADE MECUM OF OPHTHALMOLOGICAL THERAPEUTICS. By DRs. LANDOLT and GYGAX. (Translation by DR. E. H. NEYMAN). Philadelphia: J. B. Lippincott Co. 1898. Price, \$1.00.

A safe guide to the "busy" general practitioner and student. The subjects are arranged in alphabetical order, which makes this little book very handy. It contains nothing concerning modern and unestablished forms of treatment.

THE KEYSTONE RECORD BOOK OF OPTOMETRIC EXAMINATIONS. Philadelphia: The Keystone. 1897.

A very handy book for recording the results of examinations of the optical and muscular conditions of eye. It is well arranged and gotten up nicely and substantially.

ABOUT CHILDREN. SIX LECTURES TO THE NURSES IN THE TRAINING SCHOOL OF THE CLEVELAND GENERAL HOSPITAL. By S. D. KELEY, M.D. Cleveland: *Medical Gazette* Publishing Co. 1897. Price, \$1.25.

This book is full of good practical advice to the class of people it is intended for and many besides. That the subject of the eyes of the newly-born and the danger from infection during and after birth has not received a more thorough treatment, is to be deplored. Nurses, it seems to us, should be particularly well posted in this direction.

SYSTEM OF DISEASES OF THE EYE. Edited by W. F. NORRIS, M.D., and CHAS. A. OLIVER, M.D. Volume II. Philadelphia: J. B. Lippincott Co. 1897.

This second volume contains chapters on "Examination of the Eyes," "School Hygiene," "Statistics of Blindness," and "Antisepsis." Among these are chapters by H. Snellen, E. Jackson, A. Javal, Geo. E. Stevens and S. D. Risley, which we more particularly recommend to our readers. Yet, it is perhaps not fair to select any special articles. They are all excellent and bear the mark of true scholarship. No oculist can well afford to do without this work.

PAMPHLETS.

"Ichthyol in Trachoma," by M. Ebersou, M.D.

"Address in Ophthalmology," by J. E. Willets, M.D.

"Report of the Nederlandsch Gasthuis at Utrecht," 1897.

"Ichthyol in the Treatment of Trachoma, Etc.," by Dr. Javorides.

"Some Statistics on Blindness and Deafness," by G. G. Lewis, M.D.

"Scopolamine Hydrobromate as a Cycloplegic," by T. E. Murrell, M.D.

"A Case of Lead Poisoning Presenting Some Unusual Eye Symptoms," by C. A. Wood, M.D.

"An Ophthalmoscopic Study of a Case of Hæmorrhagic Neuroretinitis," by Ch. A. Oliver, M.D.

"An Arithmetic and Geography on Blindness in New York State," by Lucien Howe, M.D.

"A Case of Bilateral Melanotic Tumors, Probably Cysts of the Ciliary Body," by M. W. Zimmermann, M.D.

"An Adjustable Lamp or Light-Screen, Especially Adapted to the Shadow-Test," by M. W. Zimmermann, M.D.

"The Normal Directions of the Planes of Vision in Relation to Certain Cranial Characteristics," by Geo. T. Stevens.

"The Directions of the Apparent Vertical and Horizontal Meridians of the Retina, Etc., With a Description of the Clinoscope," by Geo. T. Stevens, M.D.

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